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edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information

of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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FRIDAY, SEPTEMBER 22, 1905.

Three weeks ago allusion was made in these columns to the effect of the new railroad construction on the grain production of Western Canada. The agricultural possibilities of this great region have so far been only lightly touched, and yet the returns are phenomenal, comparable with successful mining operations. For example, the Manitoba region, with a population of, roughly, 40,000 polls, produced last year \$100,000,000 of agricultural returns; an average of \$2,500 a year for each head of a family. We know of no like result anywhere else. The new Grand Trunk Pacific is about to increase these possibilities by its line, which opens an enormous addition to the wheat belt. In view of these facts, the Dominion Government's Tariff Commission is making local investigations of the effect of duties on United States manufactures of agricultural machinery and tools used in railroad construction, such as rock drills, steam shovels and grading machinery. The present duty is from 20 to 25 per cent. Its circular letter is mainly devoted to an inquiry for determining to what extent the consumer pays the duty and whether or not the effect of heavy duty is to reduce the quality. The facts obtained through this series of inquiries and the use which the Commission makes of them will be interesting to United States manufacturers, but the student of economics will not look for the development of any new laws or principles. The vital interest in the Commission's report and the action which may be taken as a result of it is rather its effect on the future of the wonderful agricultural region being opened up by the Dominion railroads.

The advantages of the three-position semaphore seem to be as follows: First.—That it makes for economy. Mr. E. C. Carter, of the Chicago & North-Western, in a paper sent to the International Railway Congress of 1900, reported that the average cost of maintaining a signal was thirty-five dollars a year. In view of the great number of signals involved in an extended application of block signaling, the savings effected by a device that consolidates two signals into one should not be ignored. Second.—The three-position signal extends the scope of application, while preserving clearness. With the constant increase in the speed of trains, the marked increase in the number of high-speed trains, and at the same time the increase in the length of freight trains and the accompanying decrease in the

ability to handle them smartly, it is becoming essential to give indications covering longer stretches of track. There are urgent objections to lengthening the blocks, so that it seems desirable to extend the indications over three or more blocks, instead of confining them to two as now. With the three-position signal this may be done and at the same time restrict the number of signal blades on a post to two, as required by the best practice. Third.—There are material advantages in having the semaphore moved through the upper quadrant instead of the lower, as in the present practice. This condition has been met by the Loree-Patenall signal. The cost of construction is reduced by eliminating the castings used for counterweights, and the danger from loading by sleet is removed, while the practicability of working this signal with the present type, with the possibility of five indications, may materially aid in developing the possibilities of signaling. What are the objections to it?

Mobile papers reported a short time ago that, as a result of local sentiment adverse to the original plan, the officers of the railroads which are to build the fine new union station there had agreed to build a train shed instead of umbrella sheds as originally planned. Just what arguments were presented to induce this change of mind on the part of the railroads we are not informed. We assume, however, that as usual in the most of such cases, the objections of the citizens are based largely, if not altogether, on the matter of appearance. If this is so, it is plain that through ignorance or mistaken pride they are failing to consult either their own comfort or that of other travelers who will use their station. The primary purpose of the train shed is, of course, to afford protection from rain, snow and wind. Its value is largely a matter of climate. In regions where the winters are long and cold and the snows heavy and frequent, the advantages afforded by the train shed at such times possibly offset its objectionable feature; though this is not necessarily true, for in inclement weather the train shed is drafty and unhealthy. But Mobile, with its short, mild winters, where snow is rarely seen, and its long, hot summers, when the discomforts of a train shed are extreme, would experience only the disadvantages; whereas, umbrella sheds, properly designed, while furnishing ample protection from rains, afford the maximum of coolness and light, and entire freedom from smoke and gas, while other nuisances of the large shed are mitigated

if not entirely avoided. Any objections that attach to the usual form of umbrella shed appear to have been overcome in the design adopted for the new Washington terminal. In appearance the roof is inverted, the low point being at the middle, over the supporting columns, and the sides extending out well over the cars. The drainage is therefore toward the middle, avoiding annoyance from drippings. A consideration which does not affect the citizens, but is paramount to the railroad companies is the greater first cost and the high maintenance cost of the train shed. These points, together with the other objectionable features, have been dwelt on at length in these columns at various times, the *Railroad Gazette* having been for years a consistent advocate of the umbrella shed. Those wishing a compromise plan will find the design of Mr. Bush, of the Delaware, Lackawanna & Western, described in our issue of September 1, most interesting.

Mr. Joseph Ramsey, Jr., has furnished one of the two highly interesting news items of the week, by advertising, over his signature as President, an appeal to the debenture and stock holders of the Wabash, recounting his services on the road, enumerating the cost of improvements made under his administration, saying that he had been denied access to the stock books of the company and asking proxies for use at the annual meeting on October 10. This notice was published after the stock transfer books of the company had been closed. In interviews since that time, Mr. Ramsey has said that he was not acting in the interest of any other railroad and that he had taken the step solely on his own responsibility and for the welfare of the road. As the result of Mr. Ramsey's campaign there is much doubt. Definite information on the subject seems to be entirely lacking. It is known in general that Mr. Gould's policy is to hold 40 per cent. of the securities of his roads, and the Wabash has long been a Gould line. It is also known that Standard Oil interests have large ownership in the property. Without the support of nearly all outside share holders, it seems doubtful that Mr. Ramsey can succeed in opposition to the Gould party; but it is only fair to him to say that in all probability he knew full well what he was doing when he took the step, and, as a railroad manager and financier, he has a high reputation to live up to. Should the control of the Wabash be taken from the Gould family, the ambitious plans of Mr. George Gould for a line under his control from the Atlantic to the Pacific would be overthrown, for the Wabash is the connecting link between St. Louis and Pittsburg. The importance of the Wabash in this proposed ocean-to-ocean line appears in the following enumeration of the controlled lines and the parts under construction. Beginning at Baltimore, the Western Maryland is in operation to Hancock, 116 miles. There is under construction a line from Hancock to Cumberland, 55 miles. The West Virginia Central & Pittsburg is in operation from Cumberland to Belington, 131 miles, leaving a so far unfilled gap of about 100 miles from Belington to Pittsburg. Here the Wabash-Pittsburg Terminal line extends to Pittsburg Junction, 60 miles, and the Wheeling & Lake Erie from Pittsburg Junction to Toledo, 150 miles. The importance of the Wabash lines from Toledo to St. Louis, 436 miles, or from Toledo to Kansas City, 713 miles, is overwhelming, for the Wabash connects at St. Louis with the Missouri Pacific line to Pueblo, 923 miles, or an alternative route on the Missouri Pacific from Kansas City to Pueblo, 640 miles. The Denver & Rio Grande reaches from Pueblo to Salt Lake City, 624 miles, where the projected Western Pacific line will run from Salt Lake City to San Francisco, about 1,000 miles. By alternative routes, therefore, the total distance from ocean to ocean is quite alike, being estimated at 3,629 miles or 3,635 miles; but the Wabash is indispensable.

A LIFE-SAVING INCIDENT.

It is not at all uncommon in attempting to derive lessons from derailments and wrecks to arrive theoretically at a conclusion that certain life-saving appliances might have prevented the disaster or lessened it. It is unusual to get an exact measurement of the value of a life-saving appliance in a case where it has just barely prevented a great disaster; and when such a case occurs, comparatively little attention is apt to be paid to it. Great tragedies arouse all of us, but prevention makes us shudder for a moment and pass by.

On August 4 last, the Atlantic City express to New York, consisting of an engine, baggage car, combination car and three coaches, was crossing a bridge over Newark Bay and met an open switch leading to an uncompleted track. The engine and tender went off into the water, and the baggage car came to rest with one end on the ten-

der and the other end on the bridge. One life was lost, that of the engineman. The combination car next behind the baggage car was derailed, but came to rest so near to the limit of the bridge floor that it might have been pushed off by hand, and we may fairly say that the limit of brake efficiency on this train was fully reached in preventing a great disaster. It is worth while, therefore, to inquire into the condition of the brakes of this train and compare it with that of thousands of other high-speed trains running every day in this country.

In 1903 some tests were made on the Central Railroad of New Jersey for the purpose of determining the proportionate value in stopping trains of the high-speed attachment to the quick-acting brake, as well as other improvements in the art of retarding trains. It may be well to summarize again here, what was demonstrated at that time, as follows:

1. It was found to be practicable to brake passenger trains at a higher percentage of their light weight than was considered standard practice throughout the country.

2. Brakes on the locomotive truck wheels shortened, approximately 100 ft., the stops of a six-car train from a speed of 60 miles an hour. The truck brake shortened the stop of three-car trains at 80 miles an hour by about 300 ft.

3. It was found practicable to brake the front trucks higher than had previously been considered good practice.

4. The use of an air gage in the cab, with connection to the driver and truck brake cylinder, frequently showed the brakes to be in poor condition when, without the gage, they were thought to be in first-class condition. This was apparently due to a liability to leakage from the driver brake cylinders, which did not ordinarily exist on cars.

5. The substitution of the quick-action triple valve for a plain triple on the tender secured a quicker application of the emergency brake because of the venting of the train pipe pressure in the cylinder instead of to the atmosphere.

6. A uniform and minimum piston travel on all the vehicles not only aided in handling the train smoothly, but shortened the stop by securing an equal distribution of brake force on all wheels and permitting the application of high braking force with little danger of skidding the wheels.

As a result of the experiment and the above demonstrations the Atlantic City express had the high-speed attachment to the quick-acting brake on the engine and all vehicles. The locomotive truck wheels were braked; there was an automatic slack adjuster on the engine truck brake; there was a gage in the cab of the engine connected to the driver and truck brake cylinders. In fact, all the appliances found to be of any value in the 1903 experiments were in use on this train, which was stopped within inches, or a fraction of a second, of complete wreck and drowning of its passengers. It is plain, therefore, that the absence of any one of these refinements of brake practice, would have resulted in one or all of the passenger cars on this train being plunged into the bay. It is highly probable that, aside from saving life, the money cost to the company of those lives and of the destruction of property has in this one incident fully paid for all the improvements.

THE CINCINNATI, HAMILTON & DAYTON SALE.

The sale of the control of the Cincinnati, Hamilton & Dayton through Messrs. J. P. Morgan & Co., to the Erie, at a price of 160 for the stock, eliminates the last important independent group of roads in trunk line territory. By the acquisition last year of the Pere Marquette and the Chicago, Cincinnati & Louisville, the C., H. & D.—"The Great Central Route," as Mr. Zimmerman called it—came into control of about 3,450 miles of line in addition to car ferries on Lake Erie and Lake Michigan, the C., H. & D. proper owns lines from Cincinnati west to Springfield, Ill., north via Dayton to Toledo, and from Dayton southeast to Ironton on the Ohio river. The Pere Marquette occupies an important place on the lower peninsular of Michigan connects with the C., H. & D. at Toledo, and has a through line from Chicago to St. Thomas, Ont., with trackage rights over the Michigan Central from St. Thomas to Suspension Bridge and Buffalo. The Chicago, Cincinnati & Louisville runs from Cincinnati to Hammond, Ind., 20 miles out of Chicago (its passenger trains to Griffith, 29 miles out), but as yet—map makers to the contrary notwithstanding—it has no line into the city. At Hammond, however, it connects with some of the Chicago belt lines. The record of these companies for the last two years is a history of syndicate transactions. First, the Pere Marquette syndicate bought \$12,071-

400 of P. M. common and preferred stock; second, the Chicago, Cincinnati & Louisville syndicate built most of that line, and was bought out for \$3,500,000, paid in Pere Marquette notes; third, the original Cincinnati, Hamilton & Dayton syndicate bought control of the C., H. & D. through purchase of a majority of the common stock. Under the guidance of this syndicate the C., H. & D. bought the stock of the Pere Marquette (which had cost the Pere Marquette syndicate [No. 1] about \$85 a share) for \$125 a share, paid for in bonds and notes of the C., H. & D. The C., H. & D. also guaranteed 4 per cent. on Pere Marquette preferred and 5 per cent. on Pere Marquette common stock. This syndicate, under threat by the minority interest in the Cincinnati, Hamilton & Dayton, bought out the preferred stockholders at a good price, thus reducing the total amount of C., H. & D. stock outstanding. Fourth, came the H. B. Hollins syndicate, formed in 1904, which bought subscription rights at a price estimated at 135 to more than 50 per cent. of the controlling interest in C., H. & D. stock owned by the original Cincinnati, Hamilton & Dayton syndicate. There were profits all along the line. The Chicago, Cincinnati & Louisville syndicate No. 2 made its profits in notes of the Pere Marquette. The Pere Marquette syndicate No. 1 made its profits in securities of the C., H. & D. The original Cincinnati, Hamilton & Dayton syndicate No. 3 profited from the sale to H. B. Hollins of the controlling interest in its controlling interest, and will profit in the final sale of the road. The Hollins syndicate profited by the difference between the price paid by it for a controlling interest in the stock owned by the original C., H. & D. syndicate and the price at which it sold its subscription rights to J. P. Morgan & Co. This scant record of the recent syndicate operations connected with the property is given in order to show the number of middlemen's profits which increased the cost of the road to the final purchaser. The financial powers which were interested enough in eliminating the C., H. & D. and P. M. system as a possible rate disturber in trunk line territory to buy control, will pay at least \$160 a share for a stock that pays no dividend, of a road that is said this year to have failed by nearly \$1,000,000 to meet its charges and guaranteed dividends, and will furnish profits to a whole line of syndicates or middlemen who have dealt in the securities of the roads during the past two years. In other words, it is still a profitable business to consolidate new "systems" out of potential rate disturbers in trunk line territory. Unfortunately, however, for the ambitions of others, this can hardly again be successfully carried out for the simple reason that material is lacking; there are no more independent roads left in that territory large enough to make such a process effective.

So far as we know, Messrs. J. P. Morgan & Co. have bought subscription rights to some 56,000 of the 65,000 shares to which H. B. Hollins & Co. held subscription rights. By the operations of the various syndicates the total amount of Cincinnati, Hamilton & Dayton stock outstanding has been reduced to 80,000 shares, of which the 65,000 shares are in the hands of a voting trust. Although actual shares of stock, amounting to a majority, are not therefore held at present by J. P. Morgan & Co., yet to all intents and purposes the road is sold; and being sold to this firm means, we are informed, sold to the Erie railroad. That this control would be divided between the trunk lines seemed reasonable, for there are no other interests in a financial position to afford to make an investment so unprofitable, *per se*, and at the same time so sound an investment for preventing loss of traffic. For some time it has been reported that the Erie has been negotiating for the property. The Erie has no line into Cincinnati, but runs trains from Dayton to Cincinnati over the Cincinnati, Hamilton & Dayton tracks. Since the C., H. & D. has gone to the Erie, it gives that road entrance to Toledo, Ironton, Cincinnati, Indianapolis and Springfield, Ill. On the other hand, the Erie brings to the Chicago, Cincinnati & Louisville a real entrance into Chicago from Griffith and Hammond, Ind. That the control of the road goes to the Erie, will be to many a strong indication that the Erie is controlled in the interests of the two dominating trunk lines. The Erie's financial weakness and the natural interest of the Vanderbilt lines in the transaction makes it seem natural that the Pere Marquette should eventually go to the Michigan Central, of which it is an active competitor all the way between Chicago and Buffalo. In addition to the value of the Cincinnati, Hamilton & Dayton to the Erie, in securing terminals and feeders, the control of the whole system will relieve the Erie, Pennsylvania, Baltimore & Ohio, Lake Shore, Big Four and Michigan Central of a weak and therefore dangerous competitor. Not only was there potential danger to the general rate situation in a combination of roads which, although almost uniformly poorly situated, could, at a pinch, handle competitive traffic in a

variety of directions, but in particular the trunk lines south of Lake Erie were losing the former C., H. & D. business. The road for about 100 miles north from Cincinnati runs through a region alive with manufacturing plants. Before taking over the Pere Marquette, the C., H. & D. turned over the large eastbound traffic from these industries to the trunk lines which it intersects between Cincinnati and Toledo—the two Pennsylvania lines, the Erie and the Lake Shore. With the Pere Marquette in the family, this traffic, instead of going east by one of the direct lines, was turned over to the Pere Marquette at Toledo, and by it carried north to Detroit or Port Huron, thence east to St. Thomas and Buffalo, taking the freight, as a traffic officer expressed it, round Robin Hood's barn to get to the coast. Thus not only were the trunk lines suffering from the natural competition of the lines in the C., H. & D. and P. M. system, but much business which they considered should naturally come to them was entirely diverted. Though at first sight it would scarcely seem that they had anything to fear from the Great Central aggregation, these facts help to show why it was important that these roads should be in safe hands. It appears, in fact, that the sale of the C., H. & D. and P. M. system is merely a modern development of the old business of selling out to strong competitors. With this latest acquisition by the Erie or its backers, trunk line territory is held in close control, in marked contrast to the territory west of Chicago, where strong competition still exists. An interesting conjecture, however, is as to whether the Detroit, Toledo & Ironton, lately formed by the same interests which have controlled the C., H. & D., from the reorganized Detroit Southern and merged with the Ann Arbor, will be taken over by the trunk line powers as was the Hocking Valley, a somewhat similar Ohio river to great lakes coal carrying road.

It is to be observed that the railroad dividing line at Chicago is not disturbed by this most recent change of control. Some members of the syndicate which held control of the road wanted to consolidate the C., H. & D. and P. M. with the Wisconsin Central and the Toledo, St. Louis & Western, which would have resulted in mixing trunk line and granger territory; but happily this possible addition of one more thorn in the flesh of Chicago rate adjusters has failed.

August Accidents.

The condensed record of the principal train accidents which occurred in the United States in the month of August, printed in another column, contains accounts of 19 collisions and 28 derailments. Those which were most serious, or which are of special interest by reason of their causes or attending circumstances, occurred as follows:

	Killed.	Injured.
1st Kendallville, Ind.	0	14
4th Bayonne, N. J.	1	0
8th Emporia, Kan.	0	10
10th Elkins, W. Va.	2	2
13th Vermillion, Ohio	12	25
15th Rushville, Ind.	0	8
16th Corona, Cal.	6	15
16th Cincinnati, Ohio
17th Bruce, Va.	15	25

The most prominent item of these nine, the last one, affords two very simple lessons; the need of derailing switches at drawbridges, and the importance of having only experienced engineers on passenger trains. Every one admits the universal application of the last-mentioned lesson, the need of a rule forbidding the sending out of inexperienced men on important trains; but in the light of this disaster a more specific question is, What regulations are established for the government of trainmasters and dispatchers in making temporary exceptions to this rule? The most noticeable point of superiority to be found in the rules of English railroads, or of the United States army or navy, in comparing them with American railroad rules, is their more careful and minute provision for a suitable temporary arrangement when regular arrangements fail; for a temporary substitute when a regular man is unexpectedly incapacitated. American railroad rules are worded as though reliable men were to be always on duty; never sick and never needing a vacation. When a railroad puts a man of little experience temporarily in a place where the maximum of experience is needed, the public charitably assumes that such course was made necessary by an emergency; but do not trainmasters and dispatchers many times submit to a supposed emergency which really is not one? In other words, do we correctly weigh the risks and put forth a reasonable degree of energy to avoid them?

There should be an interlocked derail at every drawbridge in a passenger line; we have called this a simple lesson. But if we may judge by the actual situation on some thin lines, not all railroad managers agree with us; except, perhaps, in theory, which does not mean much. If the traffic on a given line is very light

the stopping of the trains before crossing is deemed a sufficient safeguard, without a derailer. But what do we mean by "very light" traffic? Is traffic light where trains carry two or three hundred passengers each?

The existence of a drawbridge in the middle of a two mile block-section, with no mechanical or electrical connection between the bridge and the block signals, is an arrangement the farthest possible removed from complete signaling; and yet it is theoretically no harder to manage than some very common conditions, such as those of outlying switches. A very simple rule serves as a substitute for interlocking, and the rule may no doubt suffice for years with an extremely small percentage of lapses or failures. But in a case where several safeguards have been omitted it is perhaps a waste of time to speculate concerning the probabilities of disaster from the failure of a single safeguard.

The Vermillion collision seems to have been due to a very well-known kind of forgetfulness and therefore would appear to belong in a common (and disgraceful) class which does not at present call for discussion—at least not in the presence of readers of the *Railroad Gazette*. The derailment at Bayonne, N. J., was discussed in our issue of August 18, and is also the subject of an editorial in this issue.

The number of electric car accidents reported in the newspapers as occurring in the month of August was 33, in which 21 persons were killed and 277 injured, the most disastrous record for many months. The worst accident in this class was that at Butte, Mont., on the 20th, when a street car was struck by a switching freight train at a crossing, in the evening, killing 10 passengers. This was reported in the *Railroad Gazette* of September 1. At the inquest it was claimed on behalf of the street railway that there was no brakeman, or other person, on the front end of the freight train (which was being pushed). It is said that the street car had been brought to a full stop before passing over the crossing. At Cincinnati, on the 16th, a street car, which was struck by the locomotive of a passenger train at a crossing, threw the passenger train off the track, and the accident appears in our train-accident record. Three of the street car passengers were killed. In a crossing accident at Columbus, Ohio, on the 10th, a switching engine of the Hocking Valley road "came out second best," the engine being derailed and getting one of its driving wheels broken, while the street car held to the rails. Twelve of the 33 electric car accidents of the month occurred in New York City or Brooklyn and five of the fatalities are charged to these 12 accidents.

Hocking Valley.

The Hocking Valley operates 647 miles of line from Pomeroy and Gallipolis on the Ohio river across the state of Ohio to Lake Erie at Toledo. It also controls the Toledo & Ohio Central, a parallel line, and the Kanawha & Michigan, which connects it and the T. & O. C. with the West Virginia coal fields. The Hocking Valley itself has been controlled since June, 1903, by a community of interest of trunk line railroads. In that year, \$6,924,200 of its outstanding \$11,000,000 common stock was sold through J. P. Morgan & Co. to the following five railroads, each of which holds the interest stated: Pittsburgh, Cincinnati, Chicago & St. Louis, two-sixths; Baltimore & Ohio, Chesapeake & Ohio, Lake Shore & Michigan Southern and Erie, one-sixth each. Thus control of the two north and south coal carrying lines is, from the trunk line standpoint, in safe hands. Before last year the Hocking Valley met almost uniformly unfavorable conditions; the depression in the iron and steel industry slackened the demand for coal, and the company suffered severely from the masters' and pilots' strike on the great lakes, which came at what should have been the most active season of the year. The traffic of the road is almost entirely in coal from West Virginia and southern Ohio to the lower lake ports, and return shipments of mineral ore to the iron furnaces. The unfavorable conditions in 1904 reduced the total freight traffic from 8,262,816 tons in 1903 to 6,977,163 tons, the bulk of the decrease being in the mineral tonnage. The past year, ending June 30, 1905, has shown an increase, but not a sufficient increase to bring the figure back to the high of 1903. The number of tons of freight carried for the year was 7,810,545 tons. The tons of freight carried one mile were 1,053,094,815 in 1903, 885,937,215 in 1904 and 998,977,025 in 1905. The average haul of freight during the three years has varied less than one mile, being about 127 miles, which shows the uniform character of the company's tonnage.

The Hocking Valley has for several years been notable in the size of its train load. In the first four months of operation after the reorganization of the Columbus, Hocking Valley & Toledo, ending June 30, 1899, the average train load was 522 tons. In 1900 the figure was raised to 646 tons, a remarkable increase. In 1901 the average number of tons carried was 645 on the entire line, 195 on the river division and 686 on the main line. During the next year there was another large increase to 678 tons on the entire line, 230 on the river division and 713 tons on the main line. These

are the largest figures in the company's history. In 1903 the figure for the entire line had dropped to 622 tons, with 230 tons on the river division and 654 tons on the main line. In 1904 there was a further drop to 554 tons on the entire line, 245 tons on the river division and 577 tons on the main line. During the past year the average train load for the entire line increased to 581 tons, with 237 tons the average for the river division and 601 tons for the main line. These are all large train loads, and the average of 678 tons in 1902 is particularly noteworthy. This was brought about no doubt by the abundant prosperity, especially in the iron and steel trades, in the latter half of 1901 and the first half of 1902. Apparently, the Hocking Valley can be most economically operated only when a maximum of traffic is available, for there has probably been no decrease in the efficiency of the motive power since that time.

The average amount received per mile from each ton of freight during the past year was 4.74 mills, against 4.96 mills in the preceding year, 4.51 in 1903 and 4.28 mills in 1902. The earnings per mile run by freight trains were \$2.75 in both 1905 and 1904, against \$2.81 in 1903. The passenger earnings of \$764,057 are small compared with the \$2,743,866 coal earnings and \$1,985,573 freight earnings. One great reason for this is the short average distance traveled, which is 19.51 miles, yet this is an increase from the figure for 1904, which was 17.65 miles. It is easy to see how many more passengers a road like the Hocking Valley must carry to make its passenger earnings even up with those of a western road. Besides this handicap, the decrease of \$67,571 in passenger earnings is stated to have been mainly due to new and increased competition of parallel electric lines. The tonnage statistics show that out of a total of 4,761,392 tons originating on the road, 3,856,074 tons were bituminous coal. Out of the total tonnage carried (7,810,545 tons), 5,111,921 tons were bituminous coal. The only other important products from the tonnage standpoint are coke, ores, stone and sand, iron and cement, brick and lime, all low-grade traffic.

The gross earnings of the property were \$6,013,215 against \$5,725,483 in 1904, an increase of \$287,732, and the net earnings, \$1,945,313, against \$1,872,863 in 1904, an increase of \$72,451. An unexpended balance of \$243,455 from previous sales of first consolidated 4 per cent. mortgage bonds was expended, \$20,772 for additions and improvements, and \$222,683 in part payment of the principal of equipment notes maturing. There was charged to "cost of road and property" \$92,615 for additions and improvements. From the equipment depreciation fund, amounting to \$396,878, included in operating expenses and set aside for the renewal of equipment, there was expended \$179,738 for the purchase of new equipment and for rebuilding. On the Toledo Division and on the Hocking Division 23 miles of 80-lb. rails were laid, a total rail renewal for the year of 4,700 tons.

On the whole, the road seems to have been well maintained, and a satisfactory traffic is at hand. With the present great prosperity in iron and steel, the earnings of the Hocking Valley should keep pace. On account of the limitations of its natural situation it can never be a great road, but as long as there is coal in West Virginia and iron ore in Michigan it will have a place in the industrial development of the country.

The principal statistics of operation follow:

	1905.	1904.
Mileage worked	647	632
Coal earnings	\$2,743,866	\$2,605,314
Freight earnings	1,985,573	1,789,722
Passenger earnings	764,057	831,628
Gross earnings	6,013,215	5,725,483
Maint. way and structures	651,206	590,360
Maint. of equipment	1,293,405	1,171,769
Conducting transportation	1,800,768	1,765,606
Operating expenses	3,860,438	3,646,789
Net earnings	2,152,776	2,078,693

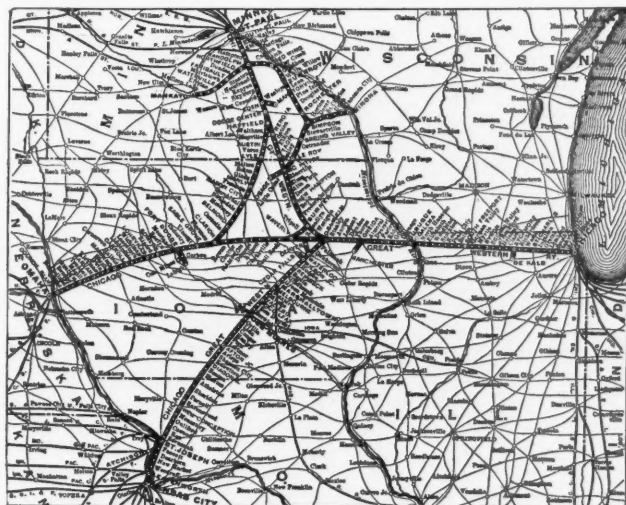
Chicago Great Western.

The Chicago Great Western has a line from Chicago west to Oelwein, Iowa, from which point three lines run, one northwest to Minneapolis and St. Paul, a second west to Omaha, and the third southwest to Kansas City. Until within the past two or three years only the lines to Minneapolis and St. Paul and to Kansas City were in existence, with few branches, and the company confined itself to through business and the traffic originating on its main line. The lines in 1901 formed, roughly, a regular figure Y, with Oelwein as the center. In 1901 an agreement was made with two syndicates which had acquired control of the Mason City & Fort Dodge Railroad, then operating a line from Mason City to Fort Dodge, Iowa, 72 miles, by which that road should be extended north from Mason City to a connection with the Chicago Great Western's Minnesota line, east from the nearest point on the Mason City & Fort Dodge line to a connection at Hampton, Iowa, with an extension of the Chicago-Oelwein line; and west from Fort Dodge to Omaha and to Sioux City. The lines mentioned under these agreements, with the exception of the Sioux City connection, were built and the transactions between the Chicago Great Western and the syndicates which built

the lines have been closed. The Omaha connection was opened in November, 1903.

The capital arrangements of the company are modeled on the English plan. The securities of the Chicago Great Western proper consist of 4 per cent. debenture stock, which partakes of the nature of both stock and bonds, 5 per cent. preferred "A" stock, 4 per cent. preferred "B" stock and common stock, with no bonds. The only mortgage indebtedness consists of \$8,366,917 first mortgage 4 per cent. bonds on the Mason City & Fort Dodge. The company is said to be the only important system in the country controlled abroad. The importance of the foreign control is shown by the powers of the London Finance Committee, whose veto on any action of the directors involving the borrowing of money, the issue of new securities and all expenditures save for operating expenses, is final.

During the fiscal year ending June 30 the average mileage operated was 818 miles. This is a decrease of 56 miles from the figure for the previous year, this amount having been transferred to the Mason City & Fort Dodge, which now operates 386 miles of line. In the agreements made with the Mason City & Fort Dodge company at the time of its acquisition it was provided that although the line should be operated as part of the Chicago Great Western, separate accounts should be kept of the earnings and expenses of each line. Out of the net earnings of the Mason City & Fort Dodge the Chicago Great Western agreed to pay the coupons of bonds issued by that company, the surplus of net earnings to belong to the Chicago Great Western. All of the stock of the Mason City & Fort Dodge is in the possession of the Chicago Great Western, having been exchanged for stock of the latter company, share for share. Practically similar arrangements are made with the Wisconsin,



Chicago Great Western.

sin, Minnesota & Pacific Railroad, another proprietary line which operates 271 miles of branches in Minnesota.

In the last fiscal year the gross earnings were \$7,377,711, a decrease of \$644,963 from the preceding year. At the same time the net earnings (\$2,254,618) increased \$136,000, or 6.4 per cent. This increase, however, would have been a decrease if there had been proper expenditures for maintenance. The decrease in gross earnings was very large in July and August, 1904, and continued until May, 1905. In May and June the earnings showed increases. Taking the system as a whole, including the two subsidiary companies, there is a mileage of 1,467 miles operated. Gross earnings were \$9,519,111, a decrease of \$118,999, and net earnings \$3,041,586, an increase of \$367,653.

There has been considerable criticism which is reflected in the current price of the company's securities, of its financial policy both as regards capital and current expenditures. This is borne out by the maintenance figures of the report. Maintenance of way, for instance, for which the company spent in 1904 about \$1,000 per mile of road, during the past year dropped to \$890 per mile on the 818 miles operated. The figure for the preceding year was based on 874 miles. Maintenance of way expenditures on the proprietary lines do not at all help to explain this low figure per mile. On the Mason City & Fort Dodge maintenance of way figures show \$364 per mile in 1905 against \$351 per mile in 1904. As this line includes most of the Omaha extension the figure seems entirely too low. On the Wisconsin, Minnesota & Pacific (branch lines) maintenance of way was about \$445 per mile in both 1905 and 1904. Thus the maintenance of way expenditures on the new main line extension to Omaha were less in both years than on the branch lines in Minnesota. The average figure for the whole system if taken together would thus be considerably less than the Chicago Great

Western figure of \$890 per mile, which in itself, for a freight road with a density of 885,000 tons of freight carried one mile per mile of road, and all of its mileage but 20 miles main line mileage, is decidedly low. For maintenance of equipment (repairs of locomotives) the company spent \$1,478 for each of the 265 locomotives owned. Repairs of freight cars figure out at \$42.50 for each of the 7,235 freight cars, and repairs of passenger cars \$737 for each of the 148 passenger cars. On the other hand conducting transportation figures show an improvement for the year. In 1904 conducting transportation was 60.40 per cent. of the total expenses, and, with general expenses, 49.95 per cent. of the gross earnings, both very large figures. The past year conducting transportation took 59.96 per cent. of the total expenses and with general expenses amounted to 47.31 per cent. of the gross earnings. In this connection it must be remembered that each year the gross earnings contained a little over \$100,000 received as surplus from proprietary companies. Conducting transportation, not including fuel for locomotives, was 43.90 per cent. of the total expenses in 1904 and 44.44 per cent. in 1905.

During the past year additions and improvements to the permanent plant were made at an expenditure of \$713,574, all of which apparently was charged to capital account. Of this sum, \$79,296 was for ballasting heretofore unballasted track.

On the Chicago Great Western proper, freight earnings, which were \$5,096,543, decreased \$714,516, or 12.31 per cent. from 1904. Passenger earnings at the same time increased 2.27 per cent. There was a decrease of 15.85 per cent. in maintenance of way expenses; 12.35 per cent. in maintenance of equipment; 18.30 per cent. in cost of fuel for locomotives; 12.17 per cent. in other conducting transportation expenses, and 5.20 per cent. in general expenses, an average of 13.23 per cent. of decrease.

The number of tons of revenue freight carried was 2,816,707, which is practically the figure for 1904. There was, however, a decrease of 36,341 tons in the number of tons carried one mile per mile of road. The average haul of each ton decreased from 285 miles to 257 miles, or nearly 10 per cent. The average amount received for each ton of freight decreased over 12 per cent. One reason for the better showing made in conducting transportation is the increase in the average revenue train load, which was 296 tons in 1905, against 272 tons in 1904, an increase of 9 per cent. The average paying load to each freight engine mile was 253 tons against 225 tons in 1904, an increase of 29 tons, or nearly 13 per cent. The number of revenue passengers carried was 2,009,022, an increase of 70,682 over 1904. The number of passengers carried one mile per mile of road increased from 91,846 to 100,563 in 1905. The earnings per passenger train mile increased over 8 per cent., from 80.49 cents in 1904 to 87.06 cents in 1905. The average number of passengers carried was 35, an increase of 3, or 9.37 per cent. over the preceding year. The mileage of locomotives employed in helping passenger trains increased 189 per cent. over the preceding year, and the mileage of locomotives employed in helping freight trains over 35 per cent. Apparently either the efficiency of the motive power was less or the increased train load was obtained by a large use of helpers on the worst grades. The figures for car mileage do not show up well, there having been an increase of 8 per cent. in the mileage of empty freight cars east, of 13.29 per cent. in the mileage of empty freight cars west, and an increase of 34.88 per cent. in the average number of empty cars per train. No classification of freight traffic is given nor are any detailed figures for the Mason City & Fort Dodge or the Wisconsin, Minnesota & Pacific included in the report.

Critics of the company's capital expenditures, already referred to, show that on the recently built lines the ratio of capital issued by the parent company to expenditure for building was about 3 to 1. As already explained, the extensions of the Mason City & Fort Dodge to connect with and extend the Chicago Great Western were built by two syndicates. In return for the lines turned over by the syndicates and the issuing of stock by the Mason City & Fort Dodge, the Chicago Great Western issued corresponding amounts of its common and preferred "B" stock, which were or still are to be sold by the syndicate managers, and also guaranteed the \$8,366,917 first mortgage bonds of the Mason City & Fort Dodge. The *Wall Street Journal* has figured that from the standpoint of the Chicago Great Western there were \$34,089,034 of securities issued to the syndicates, who made an average profit of 15 per cent., in return for \$11,575,416 cash expenditure on the new lines, or an excess of capital over cash expended of \$22,513,618, or 200 per cent. This seems a most extravagant method of financing, especially with a profit and loss surplus of only \$213,075, and can only be explained on the English theory of turning over all profits at once to the security holders while providing for all new expenditures by issues of additional capital. This course is further carried out in the recent vote of the stockholders (Sept. 7), to increase the preferred "B" stock by \$14,000,000 and the declaration by the London Finance Committee of a 5 per cent. dividend payable in February, 1906, on the preferred "A" stock. Whether this system, if further carried on, will prove successful,

or even safe, for this American railroad, perhaps the weakest in its highly competitive territory will be interesting to observe. The issue of new securities cannot be carried on forever—the capital stock has been increased from \$52,000,000 in 1899 to \$91,000,000 in 1905, with an actual decrease of over 100 miles in the mileage operated—and there are over \$7,000,000 notes maturing during 1908 and 1909. However these are to be met, current expenditures for maintenance must soon be increased if the road is to hold its share of competitive business.

The principal statistics of operation for the Chicago Great Western proper follow:

	1905.	1904.
Mileage worked	818	874
Freight earnings	\$5,096,543	\$5,811,059
Passenger earnings	1,820,564	1,780,151
Surplus earnings, prop. lines	103,686	100,889
Gross earnings	7,020,793	7,692,100
Maint. way and structures	728,015	865,142
Maint. of equipment	304,554	1,032,007
Conducting transportation	3,971,433	3,565,096
Operating expenses	5,123,003	5,904,057
Net earnings	2,254,618	2,118,617

Denver & Rio Grande.

The Denver & Rio Grande occupies most of Southern Colorado and has a through line from Denver and Pueblo to Salt Lake City and Ogden, Utah. The Missouri Pacific meets it from the east at Pueblo and thus it becomes part of a through trans-continental line. Its lines reach most of the important mining districts in Colorado. Including the Rio Grande Western it operates 2,470 miles of line, of which 907 miles are narrow (3 ft.) gage. Thus, in addition to its 1,563 miles of standard gage lines, it operates more narrow gage track than any other railroad in the country. The Denver & Rio Grande Railway was incorporated in 1870; right of way was granted by act of Congress in 1871, and track laid between Denver and Colorado Springs (75 miles) before the end of the latter year.

For a year, from December, 1878, the line was operated by the Atchison, Topeka & Santa Fe and also by a receiver, pending legal proceedings to set aside an alleged lease to that company. The result of the contest, which involved possession of the Grand Canyon of the Arkansas, was an agreement in March, 1880, that the Atchison, Topeka & Santa Fe should not for 10 years build through any portion of Colorado west of the Denver & Rio Grande, nor through any portion of New Mexico north of the 36th parallel and west of the summit of the Spanish range; also, that the Denver & Rio Grande should not for the same length of time push its lines into Colorado east of this same north and south line, or to Trinidad, or into that part of New Mexico east of the Spanish range or south of the 36th parallel, except in the western part of New Mexico. By the middle of 1883, the length of line had been increased to 1,644 miles (all narrow gage) by the completion of the Denver & Rio Grande Western with 368 miles of line from the Utah border to Salt Lake City and Ogden. This was leased to the Denver & Rio Grande. In March, 1884, default was made on its bonds guaranteed by the Denver & Rio Grande, and in July the road was abandoned by the lessee to a receiver, who immediately took charge.

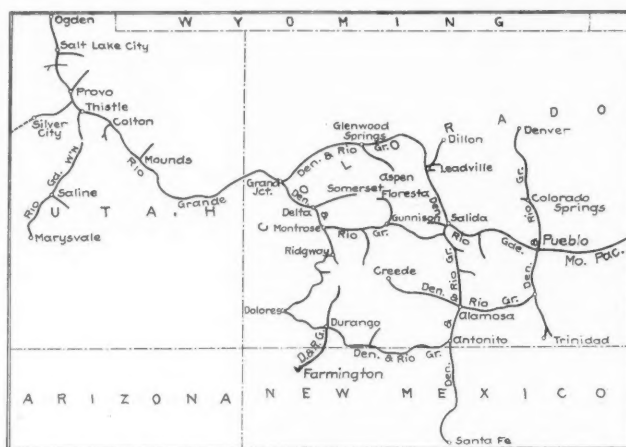
In July, 1884, the parent road itself defaulted on its general mortgage bonds and was placed in the hands of a receiver. In the same year a representative of a bondholders' committee made an inspection of the road, and found most of it in fair condition. The chief improvements needed were widening of the roadbed over much of the line; the substitution of iron bridges for wooden, and especially for pile bridges, ill adapted to the rapid mountain streams of Colorado; ballasting of the road, and the use of 40 or 45-lb. steel rails in place of the 30 and 35-lb. rails with which much of the road was laid. A number of branch lines had been built to serve an insufficient traffic. Six of these, with a total mileage of 496 miles, did not at the time earn their working expenses, to say nothing of interest on their cost. The fixed charges were considered too high for a new line the inefficient condition of the company ascribed to, first, careless management; second, high fixed charges resulting largely from the building of unprofitable lines; and, third, a severe winter and the depressed condition of trade and mining. The expert held that from the nature of the country the road could not expect to be supported from agricultural or stock traffic, but must expect to depend largely on mines, and its earnings must therefore fluctuate considerably with the changing conditions of the mining industry. The Utah line of the Denver & Rio Grande Western he found in very poor physical condition. This was an expert opinion of the material with which the new company started to make a paying railroad.

In the year in which this examination was made (1884) gross earnings were \$5,552,104, a decrease of \$1,003,675, or over 15 per cent. from the figure for the previous year. Net earnings were \$1,541,923, a decrease of \$826,536, or 35 per cent. Net earnings per mile had decreased 36 per cent. In 1885 a new company, the Denver & Rio Grande Railroad Company, was organized as successor,

The Denver & Rio Grande Western was not at that time re-consolidated, but was itself reorganized in 1889 as the Rio Grande Western. In 1901 control of the Rio Grande Western was acquired by the purchase of 100,000 shares of its common and 75,000 shares of its preferred stock, \$20,750,000 D. & R. G. preferred stock being issued to provide the necessary funds.

In 1901, including both roads, there were 2,121 average miles operated; gross earnings were \$11,474,871; net earnings were \$4,684,942; gross earnings per mile were \$5,410, and net earnings per mile, \$2,209. Two years later came the panic of 1893, when, with 52 more miles of line, the gross earnings dropped to \$8,577,362 and net earnings to \$3,227,798, or \$1,485 per mile. Since that time, the record of the road has been one of steadily increasing prosperity. In the fiscal year ending 1898 gross earnings had come to be again considerably over 11 millions and net earnings over 4½ millions. For the next five years gross earnings were respectively, \$12,623,236; \$14,756,683; \$16,359,610; \$17,036,828, and \$17,304,559. This last figure, for the fiscal year ending 1903, is the largest in the history of the road. Net earnings similarly increased from \$4,618,438 in 1898 to \$4,828,260; \$5,554,835; \$6,012,474; \$6,705,286, and \$6,664,709 in the fiscal year of 1903. Then in 1903-1904 came the severe labor troubles in the mining camps of Colorado which quickly showed their effect in a shrinkage of \$883,388 in freight revenue, the loss being almost wholly on the D. & R. G. proper, where the disturbances occurred. This broke the uninterrupted record of increases in earnings.

For the year just closed net earnings were the largest in the history of the country, amounting to \$6,862,547 for the 2,420 miles operated, or \$2,836 per mile of line. Although the gross earnings (\$17,031,507) were not as large by nearly \$300,000 as in 1903, the reduction of \$460,889 in expenses from the 1903 figure more



Denver & Rio Grande.

than compensated for the difference. Gross earnings increased \$585,072, or 3.56 per cent. over 1904, and net earnings, \$474,555, or 7.43 per cent.

After all charges against income, including a 5 per cent. dividend on the \$45,600,000 preferred stock, \$120,000 was contributed to the renewal fund and a surplus of \$562,452 remained from the year's operation. From this surplus, an appropriation of \$132,915 was made for betterments and \$150,000 was devoted to the purchase of 10 standard-gage freight locomotives, leaving a final surplus to be carried to profit and loss of \$278,537. During the year, three branches amounting in the aggregate to 16 miles were put in operation, or acquired. It is the object of the management to have the entire main line from Denver to Ogden laid with 85-lb. rails. Most of this work between Denver and Grand Junction has been completed, the lighter rail released being used on branches. During the next fiscal year it is proposed to replace with 85-lb. rail nearly all of the 140 miles of 65-lb. rail still remaining in the main track of the Rio Grande Western. During the year 20 miles of 30-lb. rail on the Crested Butte branch of the Third division were strengthened with 65-lb. second-hand rail transferred from the main line.

Freight earnings were \$11,932,420, an increase of \$534,315, and passenger earnings, \$4,039,418, an increase of \$80,166. Express, mails, rents, and miscellaneous earnings amounted to \$1,059,670. In maintenance of way expenses, which took \$1,629,172, there was a decrease of \$162,889 from the preceding year. Expenses for maintenance of structures are reported separately and amounted to \$369,322. There was an increase in maintenance of equipment payments of \$112,004. The figure for the year is \$2,031,523. There was also an increase of \$163,460 in conducting transportation, on which \$5,632,606 was expended. The total expenses increased \$110,517 over the preceding year. The percentage of operation decreased from 61.16 per cent. to 59.71 per cent., between which range the figures

for the past ten years. Among the detailed expenses the largest increase of any is in fuel for locomotives, which increased \$89,647 over 1904. This is surprising in view of the large decreases in this item reported by most of the companies which have recently issued annual statements. The next largest increase is in repairs and renewals of freight locomotives, which increased \$53,754. Repairs and renewals of passenger locomotives at the same time increased \$23,229, and of switching locomotives, \$43,542. There is a large increase (\$49,103) in payments for injuries to persons, from \$68,230 in 1904 to \$117,333 in 1905.

The improvements during the year, for which \$244,733 was expended on the D. & R. G. proper and \$80,281 on the R. G. W., a total of \$325,015, were charged, \$90,223 to income and \$154,510 to capital account on the D. & R. G., and \$43,692 to income and \$36,590 to capital account on the R. G. W., a total of \$133,915 charged to income and \$191,100 to capital during the year. The largest items in the freight traffic, as was to be expected, are products of mines. Bituminous coal amounted to 2,399,081 tons, or 34 per cent. of the total tonnage; and precious ore to 1,953,666 tons, or 27 per cent. The first of these items furnished \$2,385,765 of revenue, or 20 per cent. of the total; and the latter \$1,974,286, or 17 per cent. of the total. These figures show that, roughly, the average revenue received from the carriage of these two most important commodities was one dollar a ton. Coke amounted to 7 per cent., stone, sand and clay to 9 per cent., and lumber to 3 per cent. of the total tonnage, the latter furnishing 5 per cent. of the total revenue. Statements of the passenger and freight business are given for each month of the year, which show that in the past year the heaviest freight shipments were in November and the heaviest freight receipts in October, while most passengers were carried in June and passenger receipts were the largest during August.

The revenue tons of freight carried were 7,166,838, against 6,960,992 in 1904. With this increase of over a million revenue tons carried there would seem to have been greater efficiency in loading, for the loaded car miles decreased from 53,511,776 to 53,254,941. On the other hand, the engine miles, excluding switching and work train mileage, increased from 5,321,904 to 5,515,470. The average train load was 206½ revenue tons, a slight decrease from the preceding year. Freight earnings per mile of road increased from \$4.753 to \$4.931, and passenger earnings from \$1.651 to \$1.669 per mile.

The average amount received for carrying a ton of freight one mile was 1.34 cents. This is a high figure and is responsible for high freight earnings per mile of road with the comparatively low freight density of 368,353 ton miles per mile of road. Had the Hocking Valley, whose report is reviewed in another column, received this average rate of 1.34 cents per ton mile, its freight earnings would have been increased by \$9,000,000, or over 200 per cent. Evidently the high average rate received is in large measure responsible for the Denver & Rio Grande's prosperity.

The fact that the Denver & Rio Grande is a mountain road is strikingly brought out by the figure for the average number of engines per train, which is 1.28 engines for freight and 1.18 for passenger. The average number of cars in freight trains was 18.67 and in passenger trains 6.18. The average haul of each ton of freight was 124 miles against 143 miles in the preceding year. The average distance traveled by each passenger was 140 miles, an interesting figure, again in comparison with the Hocking Valley with its average passenger journey of less than 20 miles.

At the close of the fiscal year, about 14 miles of track had been laid on a 47 mile line southwest from Durango, near the southwest corner of Colorado, to Farmington, New Mexico, at the junction of the San Juan and Las Animas rivers. As provision for such an extension was made in the charter of the company, the line was built directly by the Denver & Rio Grande. Track laying was completed early in September. Farmington is the principal town in these river valleys, which are growing farming communities. The expenditure for this line is estimated at \$750,000, to provide for which and also for additional facilities, \$1,200,000 of \$5,600,000 preferred stock already authorized was issued. During the months of May and June very considerable damage was done by floods, which at times caused an entire suspension of local traffic on some of the narrow gage lines.

The proposed Western Pacific Railroad is considered in detail by President Jeffery. The building of this line he justifies for two reasons: First, because of the control of the present western connection by competitive interests and, second, because of the size and rapid growth of Pacific Coast traffic. As long as the Central Pacific between Ogden and San Francisco was not controlled by competing interests the Denver & Rio Grande was in a position to receive its full share of the through traffic, which it did for many years. One of the main reasons which influenced the management to acquire the Rio Grande Western was the closer relationship and freer interchange that would be established with the San Francisco line of the Central Pacific. Subsequent events disappointed these hopes, for the Central Pacific was acquired by Union Pacific inter-

ests, and this led to unexpected restrictions on interchange and more especially, unlooked for impediments in the way of securing traffic in territory reached by the Southern Pacific. On this account and also because of the rapid development of the commercial, agricultural and industrial interests on the Pacific coast and the increase of commerce with the Philippines, China and Japan, the management was led to investigate the feasibility of an independent line from either Salt Lake City or Ogden to San Francisco. Careful investigations and surveys were made by the Denver & Rio Grande, for the purpose of determining the best available route. These engineering efforts were successful beyond expectation and the main line of the new Western Pacific has now been definitely located. Through the Sierra Nevadas, this has a maximum grade of one per cent. in both directions and lighter grades on both sides of the range, with satisfactory alinement throughout. Mr. Jeffery states that in general desirability and advantages this affords a route superior to any existing line to the California coast. The main line between San Francisco and Salt Lake City, where it will connect with the Rio Grande Western, is to be built according to trunk line specifications, and laid with 85-lb. rails. The capital stock of the Western Pacific, at present \$50,000,000, is shortly to be increased to \$75,000,000, of which the D. & R. G. and R. G. W. will hold two-thirds or \$50,000,000. Financial arrangements for building the road were completed in the last three months of the fiscal year by the sale of \$50,000,000 first mortgage 5 per cent. 30 year gold bonds. The proceeds will, it is estimated, cover the cost of the main line, terminals and equipment to the amount of \$3,000,000. The President of the Denver & Rio Grande has been elected President of the Western Pacific. The Rio Grande Western undertakes to advance additional funds if the proceeds of the first mortgage bonds of the Western Pacific shall prove insufficient to complete the main line, receiving for any such advances second mortgage 5 per cent. bonds of the Western Pacific; the Denver & Rio Grande and the Rio Grande Western jointly agree to make up any deficit in the earnings of the Western Pacific necessary to meet its operating and maintenance expenses and taxes, and, after completion of the main line, which is expected to be in 1908, the interest on its \$50,000,000 first mortgage bonds. Thus control of the Western Pacific has been acquired without any immediate money outlay and with only a contingent liability for the future.

The Western Pacific is, of course, the much heralded Gould Pacific connection and is to interchange trans-continental traffic with the Gould roads further east. Assuming, as Mr. Jeffery says, that it will be a better line than any existing line to the California coast, the Gould through route must meet the handicap of the Denver & Rio Grande's heavy country and steep grades. Westbound its limiting gradient is now 2.40 per cent., and eastbound, 4 per cent. The distance over the D. & R. G. from Pueblo, the junction with the Missouri Pacific, to Salt Lake City, the junction with the new Western Pacific, is 624 miles. By the Union Pacific from Cheyenne, almost directly north of Pueblo, to Ogden, is 485 miles. From Denver to Salt Lake by the Denver & Rio Grande is 742 miles; from Denver to Ogden by the Union Pacific is 591 miles. The Western Pacific end of the line will have to be considerably better than the present Central Pacific in order to compensate for these disadvantages. It is probable, of course, that before the Western Pacific is finished the Denver & Rio Grande will prepare for increased trans-continental traffic by improvements to its line. The mountains of Colorado, however, can never be improved away and will always be a handicap. The necessity of paying the first three years' interest on the Western Pacific bonds out of capital will reduce the amount of money available for building that road by nearly \$9,000,000, which, with the discount on the bonds at the time of sale, will leave only about \$37,000,000 cash available. For the line as projected this seems too small an expenditure. There is also to be reckoned with for the D. & R. G. the threatened competition of the Denver, Northwestern & Pacific, the "Moffat" road already in operation for more than 100 miles from Denver toward Salt Lake. If this road is carried through and a projected two and a half mile tunnel bored through the mountains of the continental divide so as to give it a limiting grade of 2 per cent., the Denver & Rio Grande may well fear it as a competitor. It seems fairly sure that the Western Pacific will eventually be a profitable investment, especially as it will open up considerable new country, but that it will at once take care of its own bonded indebtedness seems not so sure. Whether the credit and resources of the Denver & Rio Grande will be sufficient to pull it through any such lean years at the start will be for the future to make clear.

The principal statistics of operation follow:

	1905.	1904.
Mileage worked	2,420	2,398
Freight earnings	\$11,932,420	\$11,398,104
Passenger earnings	4,039,418	3,959,252
Gross earnings	\$17,031,507	\$16,446,435
Gross earnings per mile of road	7.038	6.858
Maint. way and structures	1,998,494	2,174,828
Maint. of equipment	2,031,523	1,919,519
Conducting transportation	5,632,606	5,469,146
Operating expenses	10,168,961	10,058,444
Operating expenses per mile	4.202	4.194
Net earnings	6,862,547	6,387,991
Net earnings per mile	2.836	2.664

TRADE CATALOGUES.

Air Compressors.—An improved Cincinnati air compressor is described in the 32-page bulletin, L 508, published by the Laidlaw-Dunn-Gordon Co., New York. This compressor is characterized by a new and simple air-valve mechanism by which the elasticity of the poppet valves is combined with the quiet action, efficiency and high-speed qualities of positively moved valves, permitting the machine, in all sizes, to be directly connected without gears or belts to electric motors and gas engines. The adaptations of this compressor to different methods of driving and to different types of steam ends, such as simple and compound, Corliss and Meyer-gear, etc., are shown by numerous illustrations. The Cincinnati gear is applied to machines for all pressures, including those for 1,000 lbs. per sq. in. and above for liquefying carbonic acid gas and charging compressed air locomotives.

Machine Wrenches.—The Billings & Spencer Co., Hartford, Conn., sends a new list of its drop forged machine wrenches, with many illustrations and tables of sizes, shapes and prices for ordering. Among others the models include the following kinds of wrenches: Standard machine, double-end for standard hexagon nuts, new line drop forged 15 deg. angle end, S 22½ deg. hexagon, double-end 22½ deg. angle, straight double-end, 15 deg. angle double-end, 22½ deg. angle double-end S, new line straight single-end, 15 deg. angle single-end drop forged of steel, special machine, general service, double head tool post, drop forged steel pin, "B. & S." adjustable spanner, and a collection of 45 miscellaneous drop forged wrenches.

The Bangor & Aroostook Railroad. with its 400 miles of track leading through the heart of Northern Maine's fishing and hunting region, takes pains to inform people that the hunting season for deer in Maine is October 1—December 15; for moose, October 15—December 1, and for ruffed grouse, September 15—December 1. Concerning the deer industry in Maine, although several thousand are killed each year, the B. & A. people think that the wild herd is not decreasing; also that the number of moose is certainly increasing in that region. On these subjects and others, they publish a small book with about 150 photographs, and this can be obtained from the passenger agent at Bangor for 10 cents a copy.

Pneumatic Tools.—Catalogue F of the Cleveland Pneumatic Tool Co., Cleveland, Ohio, just issued, is 6 in. x 9 in. and has 63 pages, showing the pneumatic devices of this company. Twenty styles of stone and scaling hammers, light and heavy chipping, caulking, beading and long and short stroke riveting hammers are illustrated by half-tone views, and the principal characteristics of each enumerated. Sectional drawings are also given to show the construction, accompanied by lists of parts. "Cleveland" drills are similarly illustrated and described. Instructions for the use and care of the tools are given, and a number of engravings from photographs showing the tools in use. Bowes hose couplings and pneumatic holders-on are other devices included.

An Instrument for Measuring the Wear of Tires.—C. G. Bacon, Jr., New York, sends a pamphlet descriptive of the Bacon tire indicator. Illustrations and a detailed description of this instrument which is used for recording the wear on tires, is given. The device complete weighs but 20 lbs. The proper method of using the instrument and numerous diagrams made with it are shown.

Machine Tools.—The Gisholt Machine Co., Madison, Wis., send pages 33 and 34 of its loose leaf catalogue. These pages contain a brief description and illustration of the company's new foundry, the main building of which covers an area of 120 ft. x 240 ft., the equipment of which throughout consists of the most modern foundry appliances.

Manila Rope.—The C. W. Hunt Co., New York, sends a leaflet and price list of its plumbago laid manila rope. A table containing the proper working loads and diameters of sheaves and pulleys to be used for hoisting rope is given, and a small sample of the lubricating plumbago which is used in making the rope is enclosed.

CONTRIBUTIONS

Advertising by Catalogue Cards.

Chicago, Sept. 13, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In connection with the editorial on "The Use of the Catalogue," in your issue of August 4th, may I suggest a larger use of the printed catalogue card on the part of those who send out the catalogues? A printed catalogue card will in many cases simplify the cataloguing of the manufacturer advertising, so that he may be more certain that the buyer has such a ready reference help. In

most instances it will be well to prepare a set of cards having at least enough titles to make sure that the main lines and any new or novel line shall be indicated.

E. G. ROUTZAHN,
Secretary Bureau of Civic Co-operation.

A Lathe for Turning Journals with the Wheels in Place on the Axle.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Among all the special machines for railroad shops I have never seen a special lathe for turning down cut journals with the wheels on. There is, I think, a considerable amount of this work to do on every important railroad, and it seems to me that a lathe for this purpose and without any unnecessary complications would find a ready sale, as it certainly could be put upon the market at a considerable less price than the standard engine lathe, which we use at present and which is constructed with a view to handling any piece of work from 4 in. to 10 ft. between centers and from 1 in. to 42 in. in diameter. These machines are provided with very numerous changes of speed and feed and full screw cutting apparatus. A lathe for turning journals should have a capacity to swing 38-in. wheels and to true up journals from 3 in. to 6 in. in diameter and from 7 in. to 12 in. long. The guide or ways for the tool carriage could be attached, or a part of the tail stock. No more than two changes of speed would be needed, so that back gear could be dispensed with. Two feeds would also be sufficient.

It would not be necessary to make it a double ender, as ordinarily only one journal is cut on an axle. It should be provided with a crane for handling the wheel and axle.

BEN JOHNSON,
Superintendent Machinery, Mexican Central Ry. Co.,
Aguascalientes, Mexico.

[A lathe made by the Draper Machine Tool Co., Worcester, Mass., and specially designed for truing up journals when the wheels are in place on the axle was described in the *Railroad Gazette*, September 1, page 66, General News Section.—EDITOR.]

Electrically Controlled Train-Brakes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Of course you know my early interest in electrically controlled brakes, and therefore I trust you will pardon this letter. In the New York *Sun* of September 14th, referring to the investigation by the State Railroad Commissioners regarding the Elevated Railroad accident of September 11, General Manager Hedley is quoted as follows:

Q. "How many cars were there in the train?"

A. "Six. Four motor cars and two trailers. The second, a trailer car, left the track, and its north end (rear end) went into the street first."

Now, I wish to ask in considering this accident, if you are doing so for the benefit of the *Railroad Gazette*, that you bear in mind what we did at Burlington with the electrically controlled air-brake, and also what was done by Westinghouse with his ordinary air-brake, with the addition of a few electrically actuated valves.

As I look at this Elevated Railroad accident, it appears to me something as follows: The motorman hit that curve at pretty good speed, evidently believing he had the right of way for Ninth avenue. The instant he struck the curve he applied the brake. The first car was retarded by the curve itself, and in addition the brake applied to the first car for a short space of time ahead of its application on the following cars; with the result that the second car was retarded at the front end by the motor car, and was being pushed from the rear end by the remaining four cars, three of which were motor cars, on which the air-brake had not yet applied. Of course, it only takes a very short space of time for the brake to apply from one car to the next, but it does require an appreciable length of time.

Had the brakes been operated or controlled by electric valves, even if only one valve at the rear end of the train, then the rear portion of the train would have been retarded just as much as the front, and there would have been a tendency to hold back the rear end of the second car, instead of the tendency, due to the momentum of the rear cars, to crowd the second car off the track.

When I think of the remarkable progress made in electrical matters since those early efforts at Burlington, it does seem strange that this agent should not be brought into play in those conditions where a small fraction of a second is supremely important, namely, in emergency stops on railroads. Here we have trains running up and down the Elevated road with electricity as the motive power, and air for the purpose of applying the brakes. Without changing that brake in the least, but leaving it as it is, simply add to it an electric switch and magnet to release the air from the different cars simultaneously, and you will have a brake which will work quicker, stop the train in shorter distance, and avoid shock and jar; and in going around a curve you would, I

think, avoid the terrible accident that happened last Monday on the Manhattan.

I am not seeking notoriety, do not want any advertisement, and do not want my name quoted in this connection. I am not trying to do business in brakes, but I am simply calling your attention to these palpable facts.

X. Y. Z.

E. B. Phillips.

Mr. Elijah Brigham Phillips, for fifty years closely identified with the railroad interests of the country, died at his home in Brookline, Mass., September 14, at the age of 86. He was born in West Sutton, Mass., and was descended from the first settlers of the Bay Colony in the sixth generation from George Phillips, the first pastor of Watertown, and Rev. Richard Mather, of Dorchester, and Rev. John Cotton, of Boston. He was a great grandson of General Artemus Ward, the first commander of the American Army. At the age of nineteen Mr. Phillips began his railroad career as a receiving clerk at the freight station of the Boston & Worcester Railroad (Boston & Albany); and he and one other man were able to do the work for the office, which handled all the railroad commerce which Boston then had with the country to the west of it. This was in 1838, before the Western Railroad had been finished as far as Springfield. To-day the similar work requires a force of several hundred.

Promotions followed until he was given charge of the freight business of the company in Boston. In the summer of 1852, when master of transportation, he resigned and went to the Toledo, Norwalk & Cleveland as superintendent. In 1858 Mr. Phillips was recalled to Massachusetts to become superintendent of the Boston & Worcester. This position he filled during the years of the war, when troops and supplies were conveyed in large quantities from Boston, which was the mustering point for Eastern New England.

In 1865 Mr. Phillips again went West, being chosen president of the Michigan Southern & Northern Indiana, then one of the largest in point of mileage in the United States. In December, 1870, Mr. Phillips, with Charles L. Colby, of Boston, formed the Phillips & Colby Construction Company for the purpose of building the Wisconsin Central.

From 1874 for a time he made his home in Milwaukee, where he removed from Chicago, intending to rest a year, but he shortly afterwards was appointed by the United States District Court for Southern Illinois receiver of the Grayville & Mattoon. Upon his election, June, 1879, to the presidency of the Eastern Railroad Company of Massachusetts for a second time he removed from the West to Boston. In this office he spent three and one-half years, increasing the prosperity of his company. The road was leased to the Boston & Maine, and Mr. Phillips went to the Toledo, Cincinnati & St. Louis. In 1883 he was elected president of the Fitchburg Railroad Company; and finally retired from active railroad management in 1890.

His two sons and one daughter all live in Boston: H. A. Phillips, an architect; W. B. Phillips, member of the Boston Stock Exchange, and Mrs. C. A. Page.

Mr. Charles Paine, who scarcely needs an introduction to *Railroad Gazette* readers, has favored us with the following fine appreciation of Mr. Phillips:

The recent death of Mr. E. B. Phillips has ended one of the most useful and brilliant careers in the annals of American railroading, as will appear from the enumeration of the offices which he held and the important results which he accomplished. The writer enjoyed the privilege of serving under him during his term as President of the Michigan Southern & Northern Indiana. That trust was one of the important ones in this country at that time.

He came to the road in the fall of 1865, when it had fairly begun to recover from the dismal financial depression following 1857, and he found a system of 524 miles of main lines and branches,

which had been saved from bankruptcy only by the most severe economy in every department, and requiring almost complete reconstruction. Mr. Phillips was then forty-six years old, full of energy, equipped with thirty years of experience in all departments, and with an honest mind, intent only upon the interests of the company. He first went over the main line in the caboose of a way-freight train, stopping at every station and seeing every agent. Very soon he established headquarters, which had been at Toledo, at Chicago. He immediately began substantial improvements. Upon the whole of the air line division there was no masonry, all streams being crossed on decaying timber trestles, as also were all important streams upon the Western division. The substitution of substantial masonry for these was undertaken, also the renewal of the track, which in winter was dangerous from broken rails. Great changes were effected in Chicago; the track which had been built in Clark street, from Twentieth street to Taylor street, was moved to a newly purchased right of way; a joint passenger station with the Rock Island Railroad, with offices for both companies, upon the site still occupied by their joint depot, was built, so that at the end of three years Mr. Phillips could report that there had been expended out of surplus earnings \$3,272,000 for the benefit of the property. Forty per cent. of the rails in the track had been renewed, as also 68 per cent. of the cross-ties. These remarkable results led directly

to the consolidation of the road with the Lake Shore, which took place in the spring of 1869—when Mr. Phillips and Mr. J. H. Devereux were appointed Vice-Presidents, each in charge of the main division upon which he had previously been supreme; but this arrangement was not satisfactory to Mr. Phillips, who soon withdrew to engage in contracting.

During his term, Mr. Phillips was distinguished by his familiarity with every detail concerning the road and its branches; he was acquainted with every person of any importance in its employ, and with most of its patrons. The road was just of the right length for him to be able to attend to the whole; and I am still of the opinion, after sixty years of observation, that no better management or discipline has ever been seen in the United States than existed on the Michigan Southern during his administration. His duties required that he should often go to New York, as well as to visit all parts of his road, and during his first year there he traveled more than fifty thousand miles.

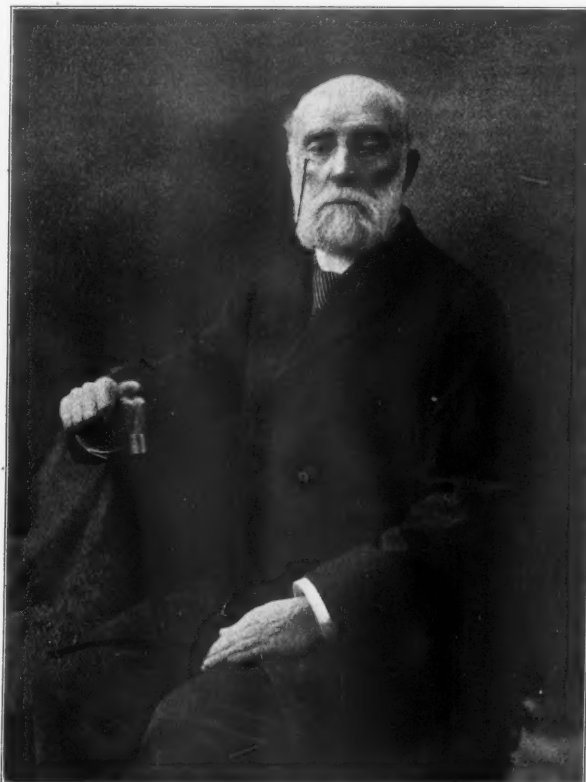
In every respect Mr. Phillips was a gentleman. In his relations with his subordinates, patient and reasonable, commanding their respect and hearty co-operation; but he let it be understood that he expected every one to do his entire duty. Towards the public his attitude was very civil, yet he exacted for his company its full rights.

He was indeed a just and fearless administrator, of the strictest personal integrity; with an amiable bearing towards his family and those who had won his friendship.

"Great men have lived among us—

Heads that planned and lips that counseled wisdom;
Better—none!"

The Chevalier Anton von Gerstner, interesting to us chiefly by his account of all American railroads at the time he visited this country in 1838, built the first railroad in Austria, "of wood and iron," as it was described, between Budweis and Linz, and worked it with horses. In 1846 an attempt was made to use not steam, but oxen, for the motive power. The Austrian Railroad Museum contains a report on this experiment. It had been hoped to do the freight business between Linz and Budweis with four "mountain draft oxen." But the report says that ox No. 1, just after leaving a station, was taken with nose bleeding, which lasted till evening. This became a common affection; the animals were hard to drive, and all in all, it was concluded that oxen were not suitable for railroad motive power—not even for freight service. A passenger car used on an extension of the same railroad as early as 1835, when it was still a horse railroad, had provision for sleeping berths. This car is preserved in the above museum.



Elijah Brigham Phillips.

Slide Valve vs. Piston Valve.*

Piston valves in locomotives were used as long ago as 1833, and since that time there have been revivals at various periods; but like some vaccinations, they did not seem to take—until within the last few years. Whether they are to become a fixture and force the D slide valve to the museum remains to be seen. Inquiries of leading roads using large numbers of piston valves, fail to bring out an expression as to which type of valve is doing the better work, the slide or the piston valve. They will say that they are both doing good work when properly designed. There are two types of the piston valve: inside and outside admission. Some are solid and some hollow. It is this modification that brings about the difference of opinion as to their respective merits.

Many broken frames and cylinders have been attributed to the piston valve. Had the trouble been looked into more carefully, they would have found some weak points in the construction, no provision having been made for special relief in case of over-pumping, condensation or careless handling of the engine.

Most modern piston valve engines are of the heavy type with cylinders much larger than were formerly used, and in a great many cases the enginemen have not taken the care of them that they did of the smaller engines; but after the engines have been in service for a while the men become accustomed to them, and the trouble generally disappears. I can see no reason why the frames and cylinders on piston valve engines, if properly designed, are subject to breakage any more than the slide valve engines, if proper provision is made against careless handling. There are four essential points to be considered—cost, maintenance, steam distribution, and fuel economy. There seems to be no question that the first cost of the piston valve is less than the slide valve on simple engines, and where four-cylinder compound types of engines are used, it takes the place of two valves and reduces the motion to that of a simple engine.

With the piston valve we get a better balance of the valve, which makes it easier to handle and decreases the wear and tear on the motion work. With the increased size of engines and steam pressure, the ordinary D balance valve increases in size proportionately, and while we may balance a slide valve in the same ratio as the valves on smaller engines, the difference in the unbalanced surface increases with the size of the engine and this increases the wear on the valve, link motion and eccentric straps, and increases the work necessary on the part of the engineer to handle the engine. This being a fact, I have experienced a great deal of trouble keeping the valves on our slide valve engines square, while on the other hand we do not experience trouble of this kind with the piston valve until after the engine has been out of the shop for a long while and the parts become badly worn. With the use of the inside admission piston valve we do away with the metallic valve stem packing, which means a great saving, as we only have the exhaust pressure on the packing side, and the fibrous packing answers the purpose and lasts a long while. With the slide valve on large engines we can hardly exceed 25,000 miles before the valves need facing, and oftentimes sooner than that. When this has to be done, it means the loss of the use of the engine for a day at least with a cost of \$12 to \$14 for labor, while with the piston valve if the rings are broken or need attention the valve can be removed, new rings applied in from 30 to 40 minutes, and the engine is ready for service again. No doubt the question will be asked, "Do the bushings ever wear?" Yes, but I have never seen a bushing that will not run from shopping to shopping, and they generally run 200,000 miles without re-boring, which is nearly always done while the engine is in the back shop. Another advantage of the piston valve over the slide valve is the accessibility to its parts. When an engine needs its valves reset after running some time, the port marks on the valve stem become obscured, and possibly the man who is about to do the work has a different tram or wants to get different marks on the stem. With the slide valve engine the machinist has to use the block and tackle and raise the covers of the steam chest before he can make his new marks, while with the piston valve he simply has to remove two plugs on each end of the chest leading directly to the edge of the steam port. This means a saving of time, and time is valuable in a busy shop or roundhouse.

It is claimed by many that what we gain in the maintenance of the piston valve we lose through the leakage of the packing rings. No doubt, there are some leaks through the packing rings in the valve as they or the bushing become worn; but, on the other hand, how many times are slide valves slightly cut and allowed to run in this condition until they wear themselves smooth again? And while they are wearing themselves smooth the engineer will double the amount of oil to the valves and cylinders to prevent the lever from driving him out of the cab.

Another thing in favor of the piston valve is that there are no steam chests to break or gaskets to leak, and all the oil used

goes directly to the valve and cylinder. It has been claimed that the piston valve engines ride hard, but often other things are the real cause. Engines set with too much lead will ride hard, or if set too late will cause them to pound. Again, the cylinder and valve may be poorly designed. If it has too little clearance, with a slide valve when compression takes place the valves can rise from the seat and thus relieve compression; but with the piston valve there is no such relief, and this will cause the piston valve engine to ride hard and may do damage unless proper means are provided for relief.

On the other hand, too much cylinder and valve clearance will cause an engine to pound through not having sufficient compression to balance the reciprocating parts, assuming that the cylinder and valve clearance are right. Then a faulty design of piston valve will invariably cause trouble. The inside admission solid valve acts as a piston for each exhaust and takes up the slack in the valve motion, and increases the lead; this is very hard on valve gears and makes the engine ride hard. The difference of pressure on the two ends of this type of valve often amounts to over a ton, for the moment after exhaust takes place the outside admission solid valve becomes unbalanced on the admission side as the steam enters the cylinder, and the high pressure at the opposite end takes up the slack and decreases the lead as the valve gear wears. In the outside admission hollow valve the area of the valve stem unbalances this type to the extent of about 600 lbs. at a 200-lb. boiler pressure, and always in the same direction which causes the engine to go lame as the gear wears. Now with the inside admission hollow valve these defects are absent and the valve is so well balanced that it works easily and requires less power to operate than the slide valve. Tests made by the C. B. & Q. demonstrated that the relative frictional resistance was only about half as much in a piston as in the slide valve.

It is also claimed that the piston valve engine will not run as fast as the slide valve engines. If this is true it is because of faulty design; for an engine intended for fast running the cylinder and valve clearance should be greater than for slow, heavy work. The faster the service the greater should be the cylinder and valve clearance.

Of inside admission piston valves there are two classes, viz.: the solid and built-up types. The solid valves use snap rings, which must of necessity be light section. When steam gets under these rings of light section it causes them to expand into the ports, and unless the corners are well rounded it may cause them to catch and break the valves or rings, or both. On the built-up type the rings may have a heavier cross section and the body of the valve may be cut away so that L-shaped rings may be used, which gives a better admission of steam. Then in case it does break it is only necessary to renew the part that is broken instead of the entire valve. It has also been said that the piston valve engine will not steam as well as the slide valve engine. I can see no reason why this should be so. In regard to the lubrication of the piston valve it has been my experience to find the piston valve much easier to lubricate than the slide valve, and where engines have to drift for a long distance it is found to be a good practice to lower the lever in the quadrant to about half way and to admit just steam enough to the cylinders and valves to carry the oil to the walls of the bushings and cylinders. I think the better practice of oiling the piston valve is to carry the oil to each end of the valve, and as the valve travels back and forth the oil goes directly to the wearing parts. This is done by having a bracket pipe leading to each end of the valve bushing from the main oil pipe. Care must be taken, however, not to drill holes in the bushing so that when the valve is standing in exhaust position at full travel the holes will come in communication with the exhaust port, because then every time the engine exhausts the oil in the pipe would be carried away with the exhaust steam.

With the piston valve we get a much larger port than with the slide valve, and this large opening gives a better admission and release of the steam to and from the cylinder than can be obtained by the slide valve. However, I have been unable to obtain any indicator cards that are comparative; but where the valve gives such a large port opening, both to the steam and exhaust, there seems to be no question but what we get a better admission and release. It has been claimed by some that the steam is wire-drawn on account of the beveled shape of the valve on the admission side; but the increased area of the port overcomes this, as it does not show on indicator cards taken with this style of valve. The modern packing ring is made in an L shape, which gives at least ¼-in. perpendicular opening to the steam port, and helps to give a better admission. With the slide valve the Allen port was introduced to get a better steam admission, and while this did help at a high cut-off, it is practically of no use in starting. While this supplementary port helps the admission of steam to the cylinder, it has no effect upon the release, as these supplementary ports do not come into play while the engine is exhausting. It is also necessary with the Allen ported valve to have the valves set with considerable negative lead in full gear forward motion on account of the lead increasing so fast as the engine is connected that when

*From a paper by L. S. Allen, read at the thirteenth annual convention of the Travelling Engineers' Association, held at Detroit, September 12 to 15.

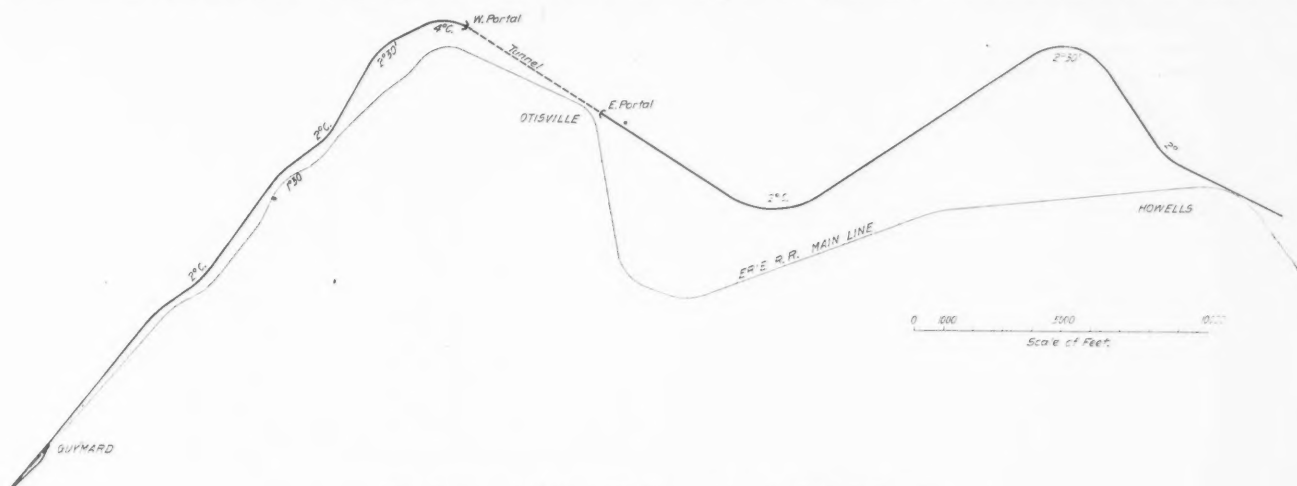
it is in the working notch without this negative lead it would have so much lead as to be a detriment. Consequently, while this port is helpful to a certain extent at high speeds it produces an engine very slow to start a train; while with the piston valve this does not occur as the opening is very large in the corner as well as while hooked up.

There were some piston valves made with the supplementary port, but they have never come into general use, and the only slide valve known to me that provides for a double exit as well as the double entrance for the steam is the Wilson valve, which takes care of both. It seems to me that the existence of these various devices demonstrates the recognized importance of giving the steam the greatest opportunity for rapidly entering and leaving the cylinder, the object being to raise the pressure in the cylinder as near as possible to boiler pressure and decrease the exhaust or back pressure, and thus increase the work done by the engine. With the piston valve we are able to use a shorter steam port than with the slide valve, and as the clearance indicates the area of the port between the valve and piston when on the center, the shorter the port the less the volume of steam to fill from the boiler at each revolution. However, it has not been found practical to use less than

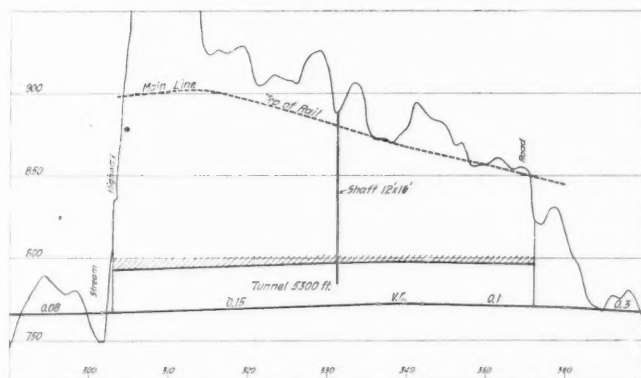
deal of the fuel economy, if there is any, in the piston valve comes about through the fact that most engines equipped with the piston valve are of recent date and have a more liberal heating surface than was allowed to many of the slide valve engines of earlier date. I do not wish to convey the idea that all piston valve engines are better than the slide valve engines, but, as I have said before, I think the design of the valve and cylinder has a great deal to do with the performance of the engine. Personally I think that there is only one type of the piston valve that will give good results under all conditions, and that is the inside admission hollow piston valve.

Grade Improvements, Erie Railroad.

The accompanying illustration shows the location of the 12 miles of new double track on which the Erie Railroad commenced work a few weeks ago. This work lies between Guymard and Howells, and it is the heaviest work in the proposed 40 miles of new road between Guymard and Highland Mills, N. Y., incorporated as the Erie & Jersey Railroad Co. This 12-mile stretch alone will cost upwards of \$1,500,000, and the total cost of the 40 miles will be



The Guymard to Howell's Improvement—Erie Railroad.



time for the cutting of the tunnel is 18 months. The new eastbound and westbound tracks when completed will have a ruling grade of 0.2 per cent. and 0.6 per cent. respectively. This will compare favorably with the ruling grades on the balance of the New York division, which extends from Jersey City to Port Jervis, N. Y. The ruling grades on this division now are 0.6 per cent. eastbound and 1.3 per cent. westbound, which includes an 18 mile helper grade having a maximum grade of 1.5 per cent. The new road is to be rock-ballasted, and 90-lb. rails will be used throughout. Messrs. Bennett & Talbot, of Greensburg, Pa., are the contractors for the work, which includes the tunnel. For the above information and illustration we are indebted to Francis Lee Stuart, Chief Engineer Erie Railroad.

Investigation of the Elevated Railroad Disaster.

The New York State Railroad Commissioners have begun an investigation of the derailment on the Manhattan Elevated Railroad, New York City, September 11, in which 12 persons were killed, and have held one public hearing (September 13), but have adjourned the inquiry to a future date not yet named. The motorman, Paul Kelly, who ran away, has not yet been found.

The evidence brought out was not conclusive. General Manager Hedley testified, that the second car ran off the track 30 ft. from the switch, and, apparently by reason of the pressure of the four cars behind it, it was pushed around so that the north end (the rear end) fell to the street first, the car finally lodging with its south end uppermost and about on a level with the track. Mr. Hedley at once examined the signals displayed on the front of the train to indicate its destination and found them showing Ninth avenue (two white disks). It seems to be agreed that this was the condition of the signals and that, therefore, the signalman's statement that they showed Sixth avenue is not true. The prescribed rate of speed for Ninth avenue trains passing this junction is 25 miles an hour.

Cornelius A. Jackson, the signalman, was called to the stand, but having been arrested on a criminal charge, took advantage of his constitutional right and refused to testify, except to say that the alleged interviews with him which had been printed in the New York papers were not authentic. To his friends, before the hearing, he had said, according to the newspapers, that after the passage of a preceding Sixth avenue train he had left his post of duty for a minute on account of illness and gone downstairs, first looking up the line and deciding that the next train to come was a Sixth avenue train. Jackson wears glasses.

Superintendent S. D. Smith testified that there is a man, called a train dispatcher, in the first story of the tower, on whom the signalman can call in case he is unexpectedly obliged to leave his post. Mr. Smith testified that Jackson had been at this tower since March 7, and had been with the company about ten years, with a clean record. He had been on duty seven hours at the time of the accident. The motorman had been with the company only seven months. He came from St. Louis at the time of the strike last March. He passed the company's examination satisfactorily.

J. S. Doyle, Superintendent of Car Equipment, said that the cars of this train were thoroughly inspected three days before the accident, and had been found in perfect condition. The flanges on the wheels of the leading truck of the wrecked car were found after the derailment in good condition; the axles were not broken and the gage was right.

Chief Engineer George H. Pegram testified that the outer rail of the curve was elevated 3 in. at a point 125 ft. from the switch.

Railway Signal Association.

The September meeting of this association was held at Chicago, Sept. 12. There were two sessions, 40 members being in attendance. Twenty-two (22) new members were elected. It was voted to use a membership badge in the shape of a celluloid button, on which is printed the association name, including "Niagara Falls, N. Y., 1905," and the individual number of each member. This is deemed desirable for the purpose of identification and introduction of members.

The Executive Committee, which had met at Buffalo, Aug. 22, made these recommendations, which were adopted: At the annual meeting (Oct. 10) a vote shall be taken as to the adoption of a permanent badge, samples and designs to be submitted at that time. The publication of a Digest of the Proceedings of the Association, to include all literature since organization to and including 1904, was recommended, and the committee will submit an index of material which it is proposed to use, also an estimate of the cost. The demand for back numbers of Proceedings has been so great as to bring up this question of reprinting.

The work of Committee No. 9, "Definitions and Nomenclature," is to be changed. It was voted that all committees appointed by the association submit definitions used in their reports to Com-

mittee No. 9, and the definitions decided on by this committee are to be recognized as standard unless otherwise ordered by the association.

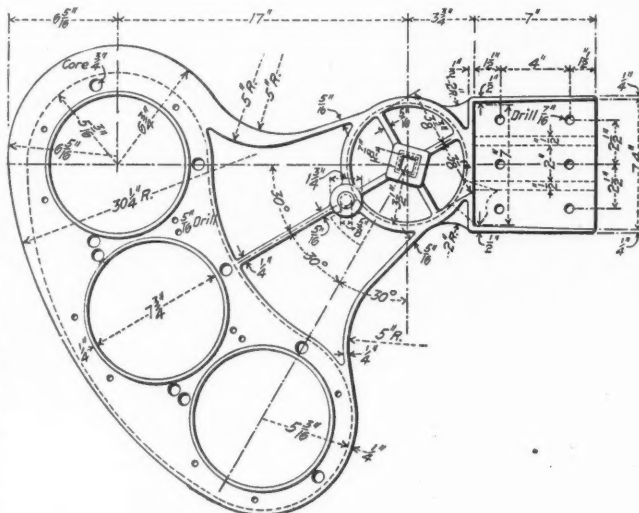
A motion prevailed suspending action on the various definitions which have been presented by Committee No. 9.

Mr. E. L. Reynolds, Electric Storage Battery Co., and Mr. M. E. Smith, Signal Engineer of the D., L. & W., presented letters in reply to Mr. Gladstone's paper read in May as to the cost of primary cells as compared with storage batteries. They quoted figures to show that the saving claimed by Mr. Reynolds in his paper presented at the January meeting was understated.

The association considered paragraphs 15 to 59 and 70 to 72, of the "Standard Specifications," as recommended by Committee No. 8, and, with a number of alterations and suggestions, to bring them up to date, all were accepted and adopted.

Letter Ballots.—At the meeting of the association held in New York in May, a committee, consisting of Messrs. W. H. Elliott, Azel Ames and A. H. Rudd, was appointed to prepare and submit to the association by a letter ballot the conclusions to be drawn from the paper on the semaphore spectacle by Mr. W. H. Elliott, of the New York Central & Hudson River, which was read and discussed at the meeting. The following conclusions were submitted by the committee to 150 members of the association by letter ballot, the 150 names including all signal engineers and men below that grade in the signal department, all technical editors, and one member from each concern that makes signals:

1. The semaphore signal spectacle must be so designed as to exert an approximately constant force through all positions of the stroke to return the signal to the horizontal position. (See illustration.)



Constant-Pull Three-Light Sixty-Degree Spectacle Designed by W. H. Elliott.

2. With a wire connected signal the constant force exerted on a 6 in. arm by the weight of the spectacle to return the signal to the stop position should be 75 lbs., which is to include the weight of the back-light casting and the balance lever weight.

3. The openings in the spectacle must be so arranged as to allow a continuous light to be shown by the lamp.

4. The size of the opening in the spectacle for the colored glass should be 7 3/4 in.

These conclusions were approved by the vote taken, as follows: No. 1 by vote of 56 to 1; No. 2, 56 to 4; No. 3, 55 to 2; No. 4, 46 to 11.

The question of the length of the sweep of the signal arm to be recommended by the association was also submitted to letter ballot. Thirty-two votes were recorded in favor of the 60 deg. sweep; six votes for 70 deg.; three for 75 deg.; and seventeen for 90 deg.

Votes were also asked for or against the use, for "proceed," of a semaphore arm inclined upward instead of downward. Twenty-four voted in favor of the upward position and 13 in favor of retaining the present practice (downward).

An announcement of the October meeting will be found in another column.

Timbuctoo may now be reached by the enterprising commercial traveler. The French have built a railroad around the unnavigable lower course of the Niger, and between its terminus and Timbuctoo, 610 miles, two steamboats make fortnightly trips, going up in about four days. A third steamboat is being built to navigate the river for some 250 miles above Timbuctoo.

The Cost of Locomotive Operation.

XII.

BY GEORGE R. HENDERSON.

(Continued from page 222.)

RUNNING REPAIRS.

These repairs are quite as difficult of satisfactory interpretation as general repairs, as they follow no general rule of common application. Some engines require work upon them every day, while others need it only at infrequent intervals. In the *Railroad Gazette*, February 19, 1904, Charles H. Fry gave the cost of handling locomotives at terminals for a number of different roads. In some cases the repairs were stated separately, from which we can obtain an idea of this cost. On the Norfolk & Western, for the first six months of 1902, the cost for repairs per engine handled ranged from \$0.96 to \$1.06, and for the same period of 1903, from \$1.20 to \$1.37 per engine, on the average. The Mobile & Ohio, for July, 1903, averaged \$0.61 for the whole line, though at one point the cost was \$1.89. The Wabash System for June, 1903, showed an average of \$0.98, different divisions varying from \$0.62 to \$1.36.

For June, 1903, the Seaboard Air Line showed an average of \$1.13 per engine handled. Several other roads, the names of which were not given, show for running repairs \$2.83 and \$2.50 per engine handled, the latter figure being stated to cover an average of 125 miles run per engine.

These figures indicate that the running repairs will probably cost from one to two cents per mile run, depending largely upon the facilities provided and the cost and quality of the labor employed. Then, of course, it must be remembered that the round-house work at some points is much more liberal and thorough than at others, and will be correspondingly increased in cost.

The sum of these two items—general and running repairs—constitutes the total repair cost of the engine. Under the most favorable circumstances, for very light engines, it is not likely to be less than 2 cents per mile run, and, in certain cases, may amount to 10 or 15 cents per engine-mile. This is a wide variation, but the causes which affect this account are very varied, both in kind and intensity.

On one of the northwestern systems, for a period of one month in 1899, a division equipped with the lightest power cost 1.95 cents per engine-mile, general and running repairs being included, while the divisions having the largest engines (20-inch cylinders) cost over 3 cents, the average for the whole line being 3.18 cents per mile, while three years later the average had reached nearly 4 cents per engine-mile. The cost of repairs per 1,000 ton-miles hauled back of tender at this latter period was 19 cents for passenger and 9.5 cents for freight engines, the former costing double the latter, showing the effect of speed and weight of train, the passenger trains being only a little over one-fourth as heavy as the freight trains.

On a road running east out of Chicago in February, 1903, passenger engine repairs averaged 5.60 cents and freight engine repairs 7.22 cents per engine-mile, or 22.88 cents for passenger and 7.73 cents for freight engines per 1,000 ton-miles. In this case the freight trains were over four times as heavy as the passenger trains, which accounts for the freight locomotives costing more for repairs per engine-mile, but less per ton-mile.

A mountain division of a southwestern line showed for January, 1903, 8.25 cents per engine-mile, and 14 cents per 1,000 ton-miles. These were very heavy locomotives, but the train tonnage was only about one-half that of the Chicago road so that while the repairs per engine-mile were only slightly greater, they were nearly double per ton-mile, this indicating the important part played by grades with this account. On the same system, but farther west, engines of the same size and build cost 50 per cent. more, as the water was very troublesome and fuel oil added greatly to the expense of boiler maintenance.

One of the southeastern lines shows as follows:

Year.	Average tons per engine in freight service.	Average cost of repairs—	
		Per freight-engine mile.	Per 1,000 freight-ton miles.
1897.....	251.43	6.41 cts.	25.4 cts.
1898.....	266.17	6.36 "	23.9 "
1899.....	277.96	6.04 "	21.7 "
1900.....	279.92	6.05 "	21.6 "
1901.....	336.11	6.82 "	20.3 "
1902.....	322.95	5.88 "	18.2 "
1903.....	302.71	6.54 "	21.6 "

Here we see that the cost per engine-mile is less than the Chicago road, but the cost per ton-mile is much greater. This is evidently caused largely by the physical condition or characteristics of the different roads. The Chicago road is nearly level, and can haul trains three or four times as heavy as on this road, which has very heavy mountain grades, and the cost per ton-mile reflects this condition. We also see that as the cost per engine-mile has an increasing tendency, the cost per ton-mile is decreasing.

Again we have different costs of repairs for different types of engines. One large road operating a number of compound locomotives of different types found that one style cost 13 cents per mile for repairs, while the other type cost only 6 cents, the engines

being nearly alike in size. It has also occurred that compound locomotives have cost nearly double (per mile) as much as simple engines, also by spending so much time in the shop, their annual mileage is very much less. This must not be thought to apply to all compounds, as some have given very good service, but as a general proposition it indicates the value of simplicity in minimizing the cost of repairs.

Unit of Cost.—Statistics of the cost of locomotive repairs might be presented in great array, but such figures convey little meaning, without knowing all the existing conditions, and while they may be interesting, they are not very instructive. As we have seen, the cost will depend upon a great variety of facts, and neither the engine-mile nor the ton-mile is entirely satisfactory as a unit. For instance, the engine-mile is practically useless as a basis of comparison between engines of different size, and the ton-mile is equally defective if we wish to compare engines on different grades and alignments.

If the locomotives are similar in weight and power, but operate on different lines or different divisions of the same line, the engine-mile unit will be the most satisfactory for purposes of comparison, but if the size and power are different, and the locomotives run over the same sections of road, then ton-mile statistics will be the most valuable. Thus in searching for a unit for general comparison, we are confronted, not only with the varying size and power of different locomotives, but also the profiles of the roads upon which they operate, and our unit should provide both for the features of engine mileage and ton mileage, as well as conditions of grade, etc.

If we use the tractive force of the locomotive, we have a unit that is a fairly regular function of the size and weight, and it is evident that if the engine is exerting the full tractive force, or only 50 per cent. of it, it is entirely immaterial whether it is hauling 80 cars on a level or 20 on a heavy grade, so long as the engine is exerting the same amount of power.

After studying the question carefully we have concluded that, when exerting a pull on the draw-bar, the cost of repairs will run about one cent per mile per ton of draw-bar pull, or tractive force at the circumference of the drivers. This unit might be termed a "draw-bar ton-mile," or more exactly a "tractive force ton-mile," and must be distinguished from ton-mile of train back of or including the engine. This unit is entirely independent of the rate of grade or curvature, and is merely the force of one ton acting parallel with the rails and at the circumference of the drivers through a distance of one mile. When the lever is in the corner, and the engine is doing its maximum work, the cost of repairs would be proportional to its maximum tractive force, and when the rate of expansion is increased, reducing the available tractive force, the cost would be proportionately diminished. It is not likely that an engine will continuously exert anything like its full power—perhaps not more than 40 per cent.—for the average time that it is working steam. Under such a supposition we should have the cost of repairs per engine-mile about as shown below:

Approximate Cost of Locomotive Repairs per Mile Working Steam.

Maximum available tractive force.		Cost	
At full tractive force.	5 tons.	At full tractive force.	At 40% of max. tractive force.
10,000 lbs.	5 tons.	5 cts.	2 cts.
20,000 "	10 "	10 "	4 "
30,000 "	15 "	15 "	6 "
40,000 "	20 "	20 "	8 "
50,000 "	25 "	25 "	10 "

These figures do not seem unreasonable in the light of our past investigations; but we must also allow for running with the throttle closed, as down hill, for example, when it is certain that there will be some wear on the machinery. This, we think, may be set at one cent per engine-mile. We could then write the estimated cost of repairs after making a reasonable mileage, and which should include both general and running repairs, under ordinary conditions, and with the ordinary types of locomotives, in the form of an equation, as follows:

Let F = maximum available tractive force as found in equation 3, but expressed in tons of 2,000 lbs.

n = average proportion of F exerted throughout the period.

m = miles run for the repair interval,

then cost = $n F m + m$ in cents or = $m (n F + 1)$(14)

In order to make clear the application, let us assume an engine of 40,000 pounds tractive force in helper service, where it is worked at full stroke up a grade, and then drops down without using steam. On the uphill portion, n will equal one on the downhill run, $n = 0$. Consider that the hill is 20 miles long. Then we should have for the cost of repairs necessary for an uphill trip equals

$$m (n F + 1) = 20 (1 \times 20 + 1) = 20 \times 21 = \dots \$4.20$$

$$\text{For the downhill trip, } 20 (0 \times 20 + 1) = 20 \times 1 = \dots .20$$

$$\text{For both trips (one round trip) } \dots \dots \dots \$4.40$$

or $\frac{440}{40} = 11$ cents a mile for the average, which seems to agree

fairly well with practice, although a close approximation to any special case could not be expected.

Again, if we have a passenger engine whose tractive force is

10 tons, and which averages 40 per cent. of this during its entire working period, we should expect the repairs to cost $(n F + 1) = .4 \times 10 + 1 = 5$ cents per mile.

In text, this formula might be easily remembered as one cent per ton of tractive force per mile plus one cent per engine-mile.

Mr. Virgil Bogue suggests a formula in which the cost of repairs and stores would be equal to .1728 times the tons on drivers, corrected by the proportion of average load to full load. With the general proportions of locomotives wherein the weight on drivers is 4 or 5 times the tractive force, the cost by this rule would be somewhat less than by ours, when the engine was fully loaded; however, as he uses higher percentages for the average power exerted by the engine, the two methods produce results not very far apart.

The most difficult part of the proceeding is to fix upon the value of n in formula 14, but as the rule itself is intended only to give an approximate idea of what the cost of repairs will be, it is not necessary to go to too much refinement. Moreover, as pointed out, the cost will vary greatly when the water or labor conditions are very different, for all of which due allowance should be made as heretofore pointed out. The most useful purpose of the rule is evidently to permit us to calculate the difference in total operating costs, for engines of various sizes over the same division, when we desire to know the relative cost of handling traffic by means of large or small locomotives. In this case, any extra flue or firebox work would probably be a nearly constant addition per mile for either locomotive, so that the difference in cost would be generally unaffected. As stated previously, costs of both material and labor vary so enormously throughout the country, or during a single year, that absolute values for totals cannot be expected, but fortunately, if our rules are logically deduced, the difference of costs for various methods of operation in the same district can be determined with sufficient accuracy to enable us to find the cheapest speed, loading, etc., for the territory in which we are interested.

The increase in cost of locomotive maintenance and operation due to the larger sizes of the machine now in use is often commented upon as comparing unfavorably with the reduced cost of transportation charges. There is little logic, however, in such criticism. From our analysis, we have seen that it is natural to expect

greater fuel and maintenance costs when the engine is enlarged. More work unquestionably requires more fuel, and heavier locomotives will certainly cost more for repairs than lighter ones. We cannot hope, therefore, to greatly increase the size of the power, and obtain large reductions in the cost per ton-mile on these two very important accounts; the cost is sure to be nearly in proportion to the work accomplished by the locomotive, which means that the fuel and repairs per ton-mile in the same service will not vary greatly, although there should be some gain in favor of the larger engines.

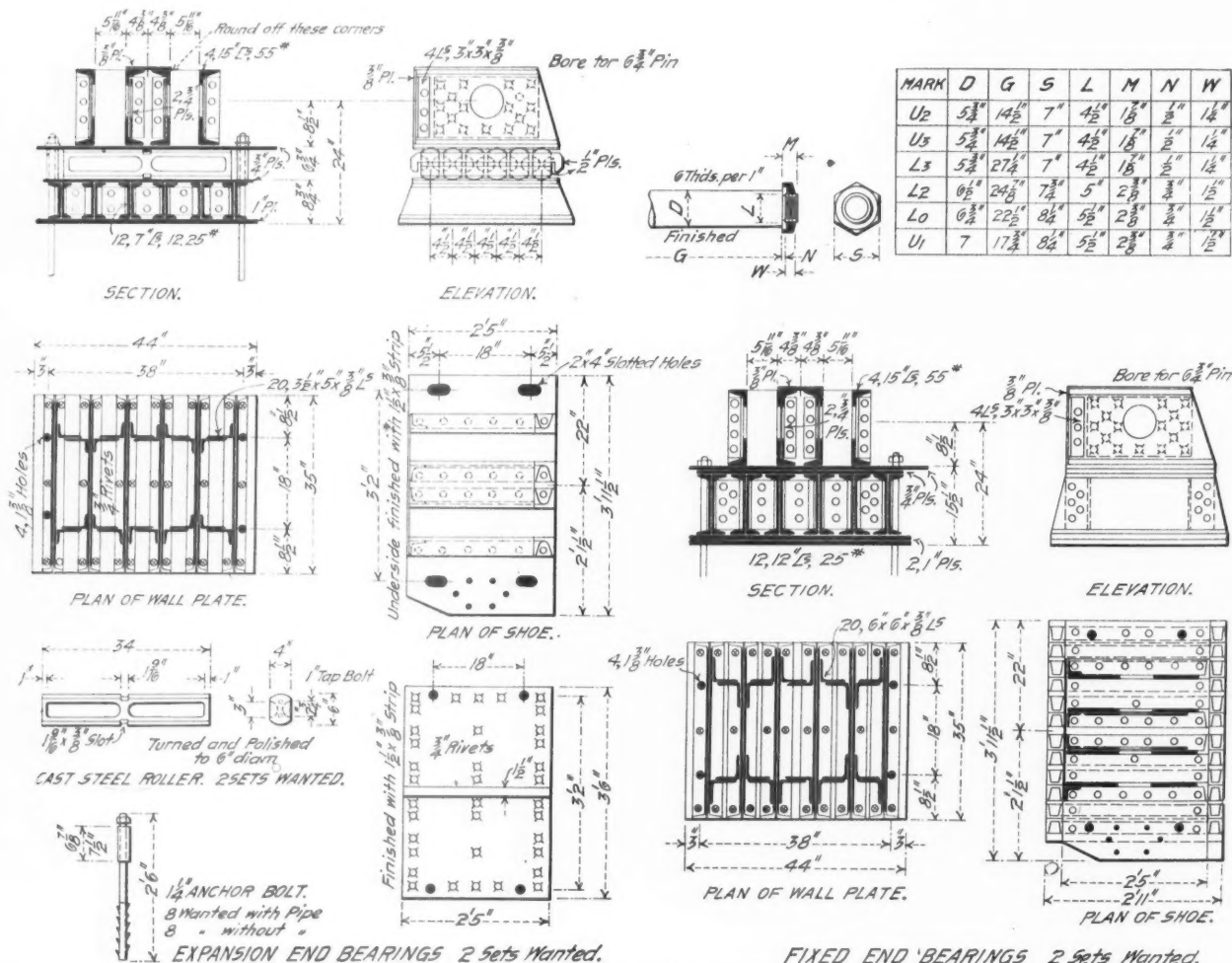
But with transportation charges this is entirely different. Outside of the switching and yard work, a long train requires little if any more labor or men than a short one, particularly since the general introduction of automatic brakes, and this fact alone is sufficient to cause a very considerable reduction in the cost of engine and train crews per ton-mile; thus the transportation accounts benefit at the expense of the maintenance charges, and instead of criticisms, the fact that the total cost of transportation is reduced, reflects credit upon the practice of increasing the power of the locomotives, which alone is responsible for the economical results obtained.

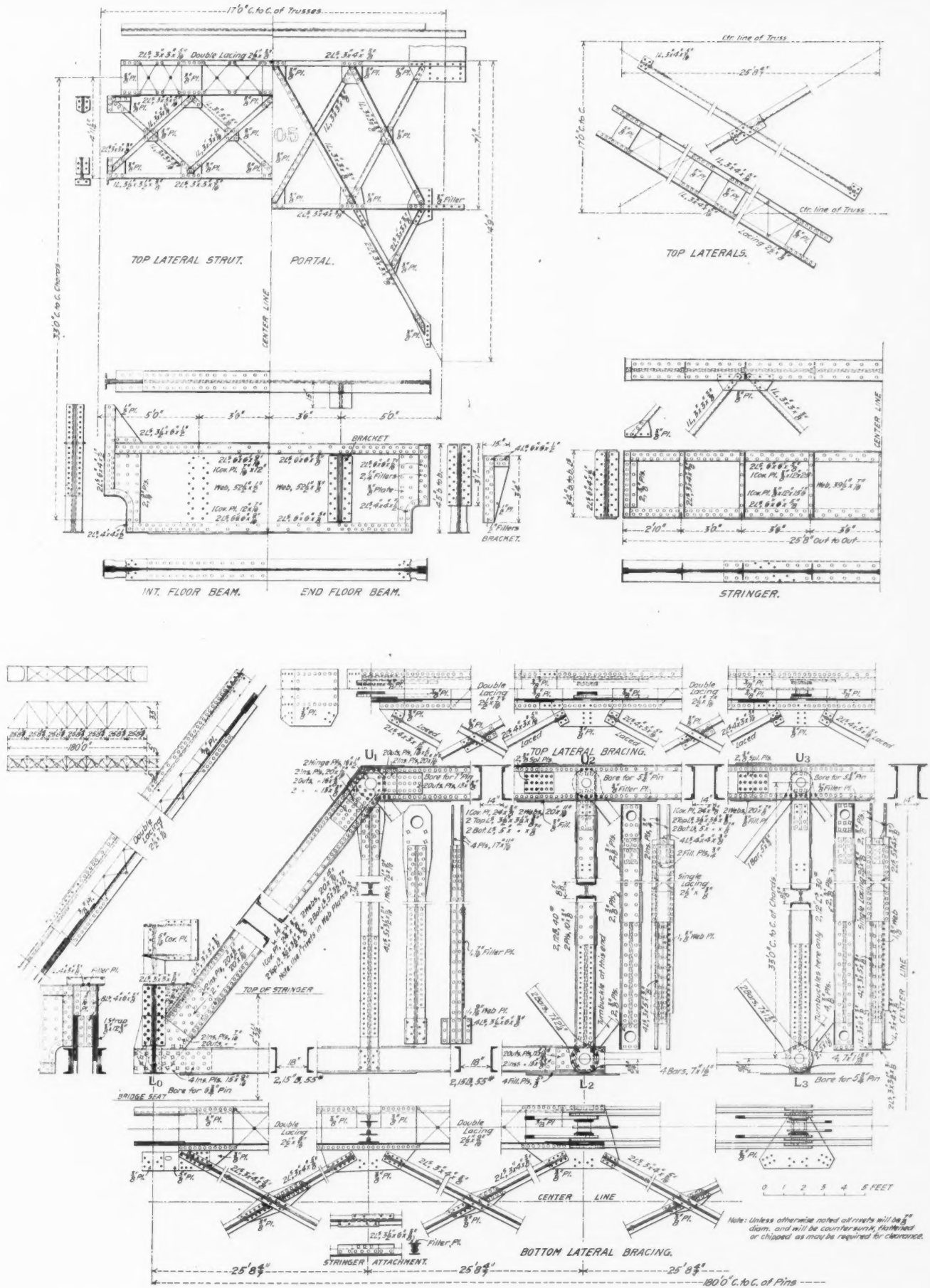
(To be continued.)

Standard Bridges on the Harriman Lines.*

The accompanying drawings show all the details of the common standard 180 ft. span through pin-connected truss bridges used by the Harriman lines. The details are essentially similar in all respects to the 160-ft. span shown Sept. 15, and an extended description is not necessary. The principal difference in the 180-ft. span is that it is made up of seven panels whereas the 160-ft. span has but six panels. The end diagonals and the top and bottom chords are fabricated in a similar manner to those used in the shorter span but are made of slightly heavier material. The end bearings are also of practically the same design as those used for the 160-ft. span. The estimated weight of the 180-ft. span which is shown is 417,000 lbs. against 348,000 lbs. of the 160-ft. span which was shown last week.

*Previous articles appeared in the Railroad Gazette March 17, 24, 31, April 7, 14, 21, 28, July 28, August 11, 18, 25, Sept. 1, 8, and 15.





Details of Trusses and Floor System of 180-ft. Through Pin-Connected Span—Common Standard, Harriman Lines.

Lightening the Work of Enginemen and Firemen.*

First keep up the locomotives. There should be a regular engineer and fireman for each engine if possible and the practice of pooling engines discouraged wherever it is not absolutely necessary on account of shortage of power. Engines should be thoroughly cleaned after each trip. This will be an inducement to the men to take better care of the engines, and will also assist them by making it easier when inspecting to detect any defect that may exist.

On the large locomotives of the present day it is almost, if not altogether, unreasonable to expect the fireman to do very much cleaning in addition to shoveling the coal, and a fireman should be relieved of all cleaning on large consolidated engines, except the cab. This he should be required to keep in presentable condition. He should also be required to keep the boxes of the tender, where the supplies are kept, in a good condition.

The engineers on large consolidation engines should be relieved of the care of the wedges, as it is almost impossible for a large man to get under one of these locomotives when they are out on the road. There is no reason why they should not be required to key the rods where keyed rods are used.

There should be suitable rest houses at all terminals, with wash-room, lounging-room and sleeping-room, kept clean, so that the men could take advantage of the time between runs to rest up and be in a better condition for the return trip.

The cab roof should be so arranged as to prevent the water from running down over the sides of the cab and the necks and backs of the engineer and fireman every time they are compelled to put their heads out of the window in a storm. The cab should be provided with a small wing window on each side to protect the eyes when looking ahead in a storm. Such a window could be made of a glass 6 in. x 8 in., framed and attached to the outside of the cab by hinges.

All injector valves should be within easy reach of the engineer or fireman; preferably, both injectors on the right side of the engine. The brake valve and throttle lever should be within easy reach of the engineer when looking ahead outside of the side cab-window. The reverse lever should be located where the engineer can throw it to either extreme without being obliged to get off the seat box. The whistle lever should be within easy reach of the engineer and not require him to stand up to sound the whistle. There should be a hose attachment on the branch pipe of at least one injector to enable the fireman to keep the coal wet and prevent the dust from flying around in the cab. The oil can tray over the fire-door should be so shaped as to shade the eyes of the engineer when the door is open. The lubricator should be far enough below the roof of the cab to give good clearance to the oil can when it is being filled. We have seen lubricators placed so near the roof of the cab that a special can had to be made in order to get at them.

Lubricator feed valves should have a gage to enable the engineer to set the lubricator feeds without having to count the drops. The front cab windows should be large enough to permit of the engineer or fireman passing out through them when necessary, and should be of a good quality of glass in order that they may be able to see accurately any object ahead. There should be a window on each side of the cab to enable them to see the top of the stack at all times. The grate-shaking rigging should be located in the deck of the cab where the grates can be shaken at any time while the engine is running, and the grates should be so arranged as to shake easily. The steam gage and air gage, especially the air gage, should be placed where the engineer can see it at a glance in daytime or night. All cab lights should be so arranged as to throw light on gages and water glass, so that they may be read properly without the engineer or fireman having to leave their seats to do so. Engines should be provided with pneumatic bell ringers and sanders.

The tender of coal-burning locomotives should have a coal space in the shape of a hopper and the rear plate have sufficient pitch so that the motion of the engine will keep the coal working forward within easy reach of the fireman. The manhole on top of the tank should be oblong in order to avoid the necessity of having to stop the engine at exactly the right spot to get the water spout in the hole. All supply boxes should be so arranged as to be accessible from the gangway.

On oil-burning locomotives the handles of the blower, heater, atomizer and firing valves should be on the left side of the cab, where they will not obstruct the room between the boiler-head and the cab and within easy reach of the fireman on the seat box. The valves for controlling the flow of steam to heater box, direct or indirect heater, or to blow dirt out of burner and valve or to drain water out of oil tank, should be placed so they can be operated from either the deck of tender or engine. Provision should be made so that brick or any other obstacle that may form in front of the burner can be removed while standing on engine deck.

Levers to side, front or back dampers should be within easy reach of the fireman. Cable to safety valve in oil tank should pass through cab to outside so it can be reached from either running-board if necessary. We would recommend the use of flexible joints for steam and oil connections between engine and tender.

One of the best labor-saving devices we have found for a long time is the pneumatic fire-door operator. The operating lever is placed in such a position on the deck of the cab that the fireman by placing his foot on it opens the door, and by moving his foot away the door is closed, thus insuring the swinging of the door between shovels of coal and preventing chilling of the flues. A device of this kind should be applied to each locomotive. Where ash-pans have to be cleaned along the road they should be made with drop bottoms, operated from the cab; the practice of crawling under engines on the main track for the purpose of hoeing out the ash-pan is not only inconvenient, but dangerous.

The reason for all these suggestions should be very plain. A train running at 60 miles per hour would travel at the rate of 88 ft. per second; so that while the engineer turns around for the short space of five seconds to apply an injector his train would have run one-twelfth of a mile, and five seconds is not an excessive amount of time to be used in applying an ordinary injector. Everything possible should be done to avoid the necessity of taking the eyes off the road ahead.

The pneumatic sander will pay for itself in a short time in the economy resulting from the saving of sand and the labor at the sand-house, besides the satisfaction in knowing that we are not going to run out of sand half way over the division on account of having to use more sand than is actually needed; not only a waste of sand, but the train hauls harder than if but a slight sprinkling of sand were used.

The Waterways of Canada.*

At the present time great schemes for the development of the natural resources of the Dominion are in progress and in contemplation. These schemes include the construction of a new trans-Continental railway, and of other new and important railroad communications; the development of the waterways between the great lakes and the Atlantic; fuller utilization of numerous sources of water-power for industrial purposes and for the production of electrical energy; as well as many other methods of increasing and transporting the natural products and the growing manufactures of this marvellous country. No engineer who visits Canada can fail to be impressed by the enterprise and courage with which the government and private associations are facing these and other great problems, upon the solution of which depends the making of a nation. When it is remembered that the total population of Canada, with its immense extent and wonderful possibilities, is only about 5½ millions of people, the scale and cost of these great engineering works seem even more remarkable.

Our visit gave only a glimpse of what has been well described in the sentence: "The profound penetration and permeation of the country by waterways is the great characteristic of Canada." We saw something of Lake Ontario and Lake Michigan, and passed the southern end of Lake Huron. We saw the Ottawa river from Parliament hill, and had a most interesting day on the St. Lawrence, when the City of Montreal provided a steamer to convey us through the Soulanges canal, and back through the famous Lachine rapids. But we had no indication of the magnitude of the great lakes and rivers, or of the canals that have been constructed to communicate between the lakes and the Atlantic. The extent of the shipping and trade of the lakes is hardly realized here, or the importance attaching to possession of traffic from the lakes to the open sea. On the other side this is well understood, and the competition is keen between the United States and Canada. On the improvement of the Erie canal it is proposed by the United States to spend about 20 millions sterling. The Canadian Government, about the time of our visit, decided to spend £50,000 on surveys and investigations as to the probable cost of making a new waterway 22 ft. deep from Georgian bay, on Lake Huron, by the Ottawa river, to Montreal. This would be the shortest distance (425 miles) from the lakes to Montreal, the port lying furthest up the St. Lawrence to which ocean-going ships proceed. By existing routes the shortest distance from Sault St. Marie to Montreal is 950 miles; the new canal would reduce this to 610 miles. The magnitude of the shipping passing through the canals at Sault St. Marie may be judged from the statement that so long ago as 1889 the aggregate tonnage approached 7¼ million tons, and exceeded the corresponding tonnage for the Suez canal by nearly half a million tons, although the navigation was open only 234 days in the year. In 1903 the traffic rose to 14,000 vessels, of 27¾ million tons; and in 1904 to 12,200 vessels, of nearly 24½ million tons. The Canadian authorities are clearly well advised in endeavoring to improve the communication of such a traffic with

*From the report of a committee, D. D. Kesler, chairman, made to the thirteenth annual convention of the Traveling Engineers' Association, held at Detroit, Sept. 12 to 15.

*Extract from Sir Wm. Henry White's report to the Institution of Civil Engineers on "The Visit to the United States and Canada."

the sea *via* the St. Lawrence, and the results of the surveys of the Georgian canal will be awaited with interest.

The Soulanges canal, which we visited, forms part of the St. Lawrence navigation. It is 14 miles long and has five locks, with a total rise of 84 ft. The locks are 280 ft. by 45 ft., with 15 ft. of water on the sills. The locks and sluice-gate mechanism are operated by electric motors, and the locks can be filled in five or six minutes, through cast-iron pipes 30 in. in diameter, passing through culverts in the side-walls. The breadth of the canal at the bottom is 100 ft., and at the water-surface 164 ft. About £1,350,000 has been spent upon its construction and equipment. The electrical equipment is worked by water-power, the head being 20 ft.; the total output is about 530 k.w. The canal is lit by 219 2,000-candle-power arc-lamps, placed 480 ft. apart, so that the navigation proceeds night and day. Electric power is also used to operate locks and bridges. There are seven bridges of 180 ft. span, each weighing about 100 tons.

Another work of which we had particulars given us by the Resident Engineer as we passed near its route, was the Richelieu and Trent canal, which will join Georgian bay on Lake Huron to Lake Ontario. The route is about 200 miles long, about 20 miles being canal. It embraces a hydraulic lift-lock, 140 ft. by 33 ft. by 8 ft., the rise being 65 ft. The fundamental idea of the promoters is to bring grain and other freight in large lake steamers to Georgian bay, then to tranship into barges of considerable size which will pass through the canal to a sheltered port on Lake Ontario, from which place groups of barges would be towed to Montreal, and their cargoes transferred to ocean-going ships.

As to the St. Lawrence itself the navigable channel to Montreal for large ships has a minimum width of 300 ft., extending to 550 ft. at the curves; and it is expected that a depth of 30 ft. throughout will be obtained next summer. Extensive works are also in progress for the improvement of the port and for increased accommodation for large ships.

The Traveling Engineers' Convention.

The Traveling Engineers' Association held its thirteenth annual convention at the Cadillac Hotel, Detroit, Mich., on the four days from September 12 to 15, inclusive. The attendance was 210 members, the largest in five years. President J. D. Benjamin was in the chair, and in his address urged that the closest co-operation be maintained between the traveling engineers and the engineers and the officers of the transportation department in order to secure the maximum results from each and every locomotive. Referring to new devices to improve the performance and efficiency of locomotives, special mention was made in favorable terms of superheated steam and of mechanical stokers. The association was declared to be in healthy condition and steadily growing.

The Secretary reported 71 additions during the year and a present membership of 532. The Treasurer's report showed total receipts for the year of \$2,531, and a balance on hand of \$500.

Hon. John B. Corliss, Congressman from Michigan, addressed the convention during its first session.

Abstracts of some of the papers discussed at the convention will be found in this issue, and others will be given from time to time. The present officers were re-elected. A committee on subjects for the next convention was appointed, and will report during the year. The next meeting will be at Chicago.

EXHIBITS.

American Locomotive Equipment Co., Chicago.—Blueprints, catalogues, etc., showing the Wade-Nicholson hollow-arch for locomotives, the Sarver valve, etc.

Webb C. Ball Watch Co., Cleveland, Ohio.—Ball official standard railroad watches.

S. F. Bowser & Co., Fort Wayne, Ind.—The Bowser oil cabinet, self-measuring pump-tank, etc., and prints and catalogues showing proper equipment of oil houses.

Crandall Packing Co., Palmyra, N. Y.—Samples of throttle-valve and air-pump packing, catalogues, etc.

Crane Co., Chicago.—The Crane locomotive safety valve and removable spring disc; also globe and angle valves.

Detroit Lubricator Co., Detroit, Mich.—Three sizes of bull's-eye type lubricators, Nos. 21, 31, and 41, of three, four and five feeds; also sectional lubricator to show construction.

Detroit Seamless Steel Tubes Co., Detroit, Mich.—Samples of locomotive boiler tubes.

Joseph Dixon Crucible Co., Jersey City, N. J.—Dixon graphite products for locomotives, including air-brake and triple valve grease; also polishing graphite for locomotive front-ends and lubricating graphite.

Fuel Protector Co., Jackson, Mich.—Catalogues showing the application of this company's fuel protector.

Garlock Packing Co., Palmyra, N. Y.—Air-pump and throttle-valve packing. Metal packing for locomotive piston rods.

Jenkins Bros., New York.—Jenkins gasket tubing for steam joints, Jenkins' 96 packing, etc.

Michigan Lubricator Co., Detroit, Mich.—"The" Bull's-eye five-feed lubricators for superheater boilers for balanced compound locomotives; also four-feed, triple-feed and double-feed lubricators.

Steel Mill Packing Co., Detroit, Mich.—Samples of "Safety" plastic metallic packing for locomotives and stationary engines.

The longest railroad route in India, from Bombay to Calcutta, is 1,401 miles long, made up of parts of different railroads. Over this route there is one through train daily, which takes 45 hours, going thus 31 miles an hour. The fastest Indian train runs from Calcutta to Allahabad, 564 miles, in 16 hours, or 35 miles an hour.

The Chicago Freight Terminals of the Chicago & North-Western.

(Continued from page 252.)

It is easy to see that to assemble the cars from the different freight houses into trains and to get the trains out of Chicago and on their respective divisions is no simple matter. The task is further complicated at present by track elevation which is under way in the Western avenue yards. Ordinarily these are the classification yards for the Galena division and trains over that division are made up there, but owing to the elevation work this for the past few months has had to be done at 40th avenue, though in a few cases trains run directly out of Wood street. As already explained, the State street house and the Grand avenue house which are in the same general section of the city, handle practically all I. C. I. freight in and out for the Galena division, and for the Wisconsin and Michigan divisions respectively. Loaded cars from State street run straight west, normally to Western avenue, at present to 40th avenue, where they are made up into trains. From Grand avenue, on the other hand, loaded cars run out via Clybourn Junction and the Wisconsin division to Mayfair, thence south (except three trains which run solid from Grand avenue) to 40th avenue, where they are classified into trains for the road. This seems a roundabout course but is necessary in order to relieve the most crowded section of the road.

Cars are transferred between all the different yards and freight houses in the Chicago terminal by transfer trains. Each of these has a crew of five men, engineer, fireman, conductor or, as he is called, engine foreman, and two brakemen. There are 16 such transfer crews. The transfer trains cover all parts of the terminal. All transfer switching is reported on the accompanying form (Fig. 7).

There are seven regular time freights westbound on the Galena division: first 119, second 119, 117, 121, first 127, second 127 and 113. First 119 is the Denver and Pacific Coast freight, and runs directly out of Wood street. It takes merchandise, perishable freight and livestock from Chicago for Peoria, Ill.; merchandise for the Anamosa line and from Carroll to Audubon, and merchandise, perishable freight, livestock and coarse time-freight for and via the Union Pacific. Second 119 is made up at State street yard and takes the cars from State street and the surplus from Wood and Sixteenth streets. It carries merchandise, perishable freight, livestock and coarse time-freight for and via Carroll, including the Sioux City division west of Carnarvon and Arcadia to Logan inclusive, for and via Council Bluffs, and for and via Missouri Valley, including Omaha local. No. 117, the Iowa Time Freight, runs out of Wood street. These three trains and No. 121, the Illinois & Northern Iowa Freight, are given not to exceed 1,050 tons out of Chicago. They are due to leave 40th avenue for the road between 6.39 (first 119) and 7.25 (121). The other three time-freight trains on the Galena division are first and second 127, Iowa Time Freights, which leave 40th avenue at 12.10 and 12.20 a.m., and 113, a new train created August 20, another Iowa Time Freight, which leaves at 12.45 in the afternoon and takes cars for points west of the Mississippi river from Chicago, taking coarse time-freight in preference. Before finally making up 113 in the 40th avenue yards the yardmaster at Chicago is advised by the dispatcher of the number of tons of time-freight to be picked up at "J. N." tower (between Melrose Park and Elmhurst) where there is interchange with the Chicago Junction, Chicago Terminal Transfer and Indiana Harbor belt lines, and at West Chicago and De Kalb. He then makes up the train so that the tonnage, including cars picked up at those points, will not exceed 1,350 tons. With the exception of the two trains which run out of Wood street, all Galena division trains are regularly made up at Western avenue, but at present at 40th avenue, owing to the track elevation work.

On the Wisconsin division, 581, the Minnesota Time Freight, corresponds to 119 on the Galena division. It runs directly out of Grand avenue, leaving at 8.09 p.m., and takes time-freight for points on the Madison division between Elroy and Winona and for all points west of Winona, and local merchandise for points on the northern Wisconsin division between Janesville and Oakfield and fills out if necessary with through loads for this territory. At Mayfair, No. 581 picks up cars of perishable goods from the 40th avenue yards. The first St. Paul Time Freight, 1st No. 583, takes time-freight from Grand avenue, Wood street, Sixteenth street and 40th avenue for and via Elroy, Wis.; also time-freight for Madison or points west. Second No. 583 takes all time-freight for or via Elroy that cannot be handled on first No. 583, local merchandise for Beloit, Harvard and points on the Kenosha division between Harvard and Kenosha, and fills out with through loads for this territory. It also takes time-freight for points west of Elroy received too late for No. 581 or which that train cannot handle. There is another time-freight (No. 585) on this division. With the exception of No. 581, all these trains are made up at 40th avenue, whence they run north to meet the Wisconsin division at Mayfair.

On the Milwaukee division, 287, the Iron Range Time-Freight, which runs directly out of Grand avenue, is the corresponding fast train to 119 and 581 on the other two divisions. Like all the

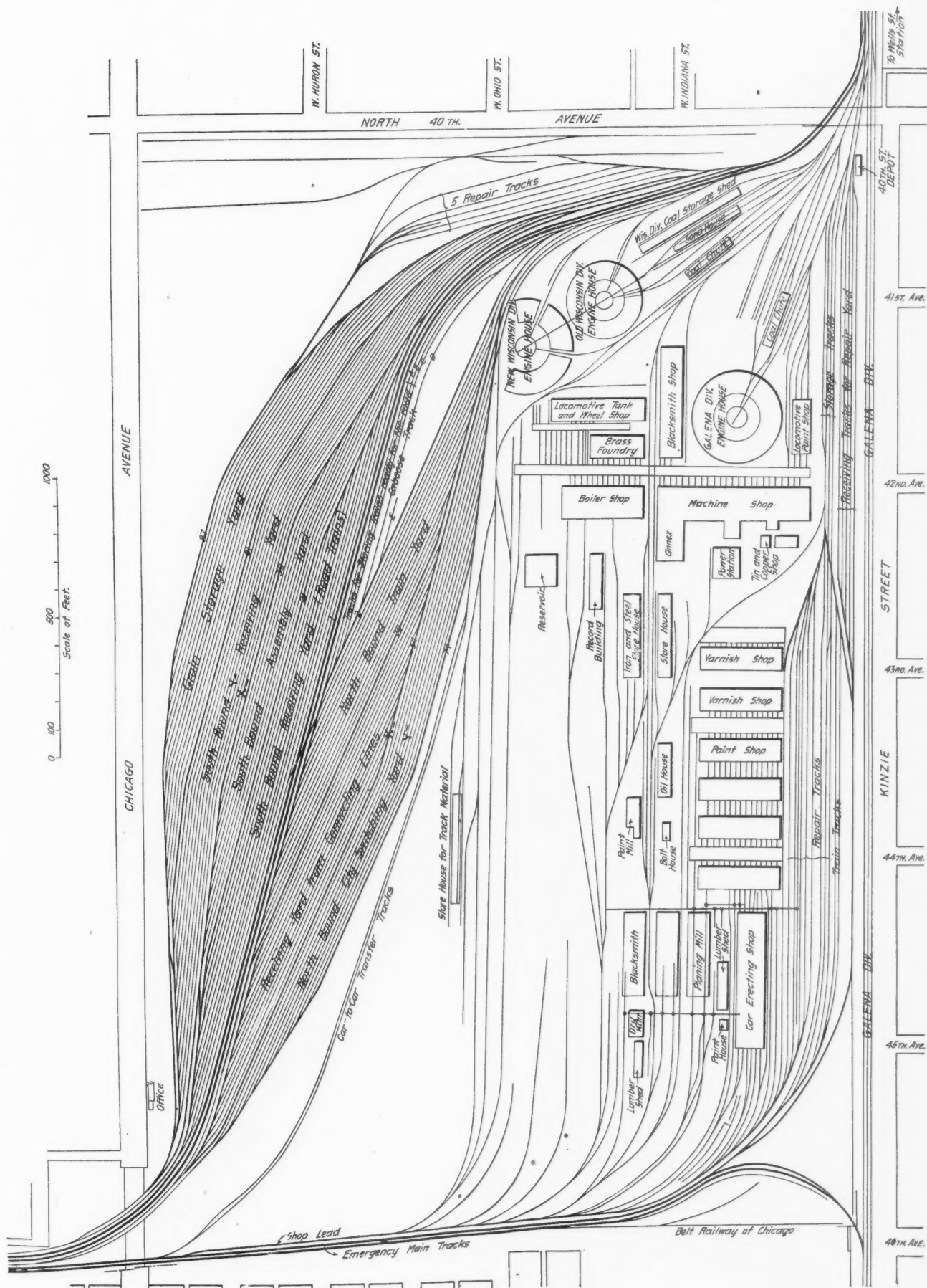


Fig. 8—Fortieth Avenue Yard, Chicago; Chicago & North-Western.

passenger trains would be sent out of Chicago by way of Clybourn Junction and Mayfair.

The Wood street yard, shown in Fig. 9, was built in 1892 when poling yards were in vogue. At that time the north track shown in the plan next to the C. & N.-W. westbound main track was used as the poling track. At present, poling no longer being used, the yard is an ordinary "break-up" yard. The plan shows the situation of the yard relative to other railroads. On the north are the main tracks and a yard of the Chicago Terminal Transfer Railroad and on the south the main tracks and a yard of the Chicago, Burlington & Quincy. This relative position of tracks continues east two miles to the Sixteenth street freight house. The markings on the plan show the general arrangement and operation of the yard. The method of handling cars through the freight house has already been described. A special track is set aside for the cars of each interchanging foreign road. When there are enough cars for a foreign road for a trip, they are handled by transfer train to the foreign road. For example, a train for the Baltimore & Ohio is usually hauled out of the yard every night. The Wood street yard has a capacity of 2,200 cars and about 17 miles of track.

Between Melrose Park and Elmhurst a new yard (Fig. 10) is being built as part of a much more extensive future plan. This is on a straight and level stretch of track about a mile and three-quarters long. The yard shown on the plan represents the work which will be done this year. With the exception of the two original main tracks, this is all new work since this spring. Melrose Park station is a short distance east of the end of the map and Elmhurst is about a mile west of the west end. At the east end of the yard there is to be a connection on each side with the Chicago Junction Railway and the other two belt lines which run over its tracks. This is a road yard and in considering its plan it must be remembered that the North-Western runs its trains left-handed. The entrance to the westbound yard is a ladder track running into 19 yard tracks. At a point not very far west of the ladder track these divide into two groups of 10 and 5 tracks respectively. At the crossing of the present highway, which is to be sufficiently elevated, it is proposed to build eventually a westbound hump and fill the space to the west, south of the present main line, with a large westbound classification yard. The proposed plan for the eastbound tracks is similar. The eastbound hump will probably be placed near the scales shown on the plan near the middle of the yard. The receiving tracks at the west end will then be added to and a number of additional classification tracks built at the east end. When the yard is finally completed according to the proposed plan it will have a capacity of at least 4,000 cars. These plans, of course, are not all definitely decided on, but suggest possible developments. The yard which is being built this year is to have 17 miles of track and a capacity of 2,000 cars. Here will be set out empty cars for the three belt roads already mentioned and dead freight awaiting delivery. The eastbound yard will also relieve the congestion within the city by handling the large shipments of grain from the west which often come very much bunched together, as many as 1,200 cars of grain sometimes coming in over the Galena division within two days' time. A mechanical interlocking plant is to be erected at the Elmhurst end and a Taylor all-electric plant in the middle of the yard. It is desired to finish the work shown in the plan before the first of October. A force of 1,250 laborers is at work and every effort is being made to hurry the yard to completion.

The yard forces employed in the Chicago terminal district include about 700 men. Of these, about 250 are enginemen (switching). On

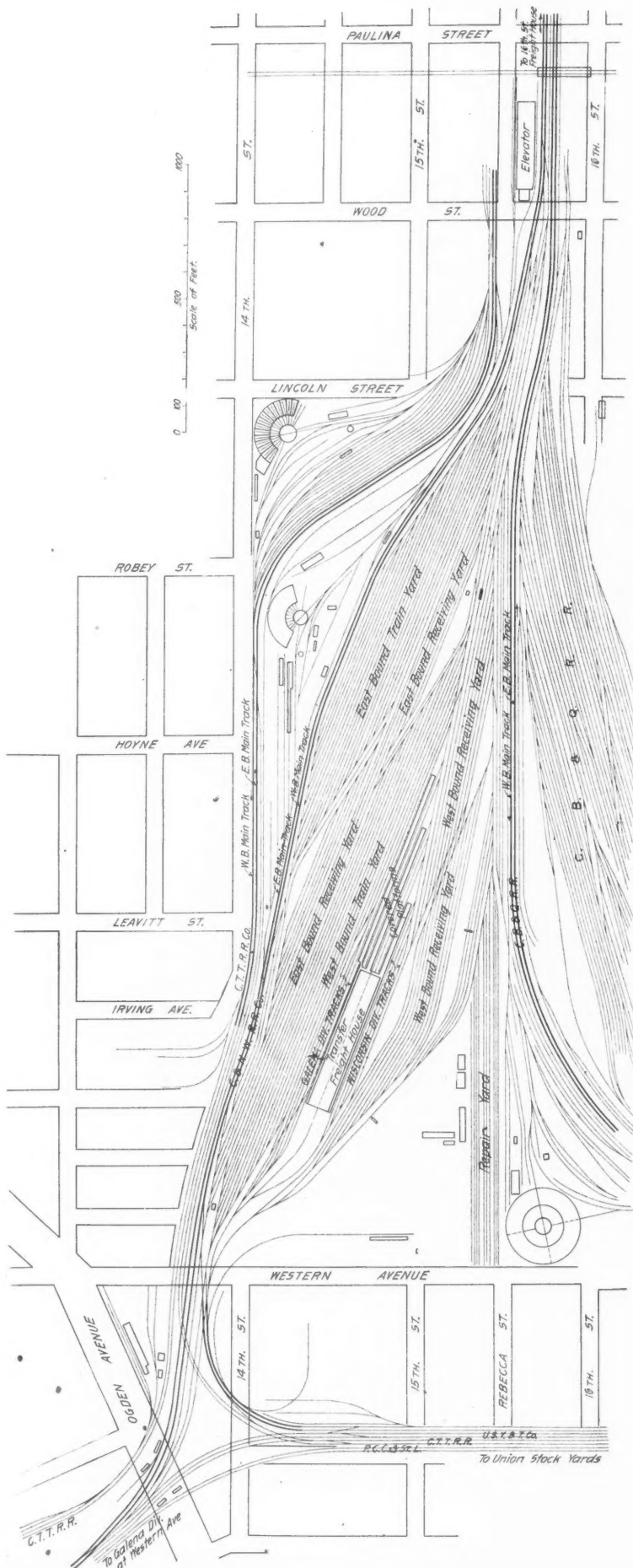


Fig. 9—Wood Street Yard, Chicago; Chicago & North-Western.

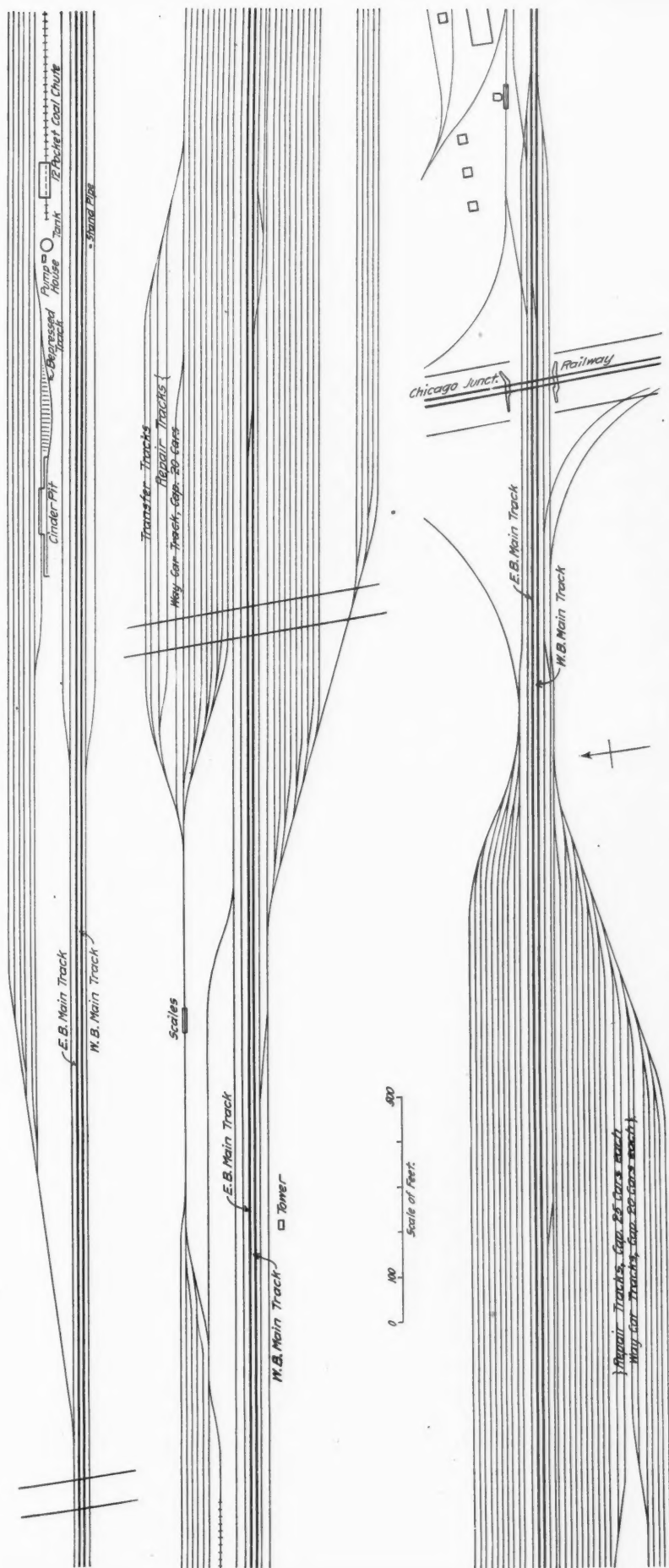


Fig. 10.—New Yard at Melrose Park, Galena Division; Chicago & North-Western.

a basis of ten hours' service equaling an "engine," there are 105 engines worked in the terminal territory. Of these, 60 work days and 45 work nights. This requires about 70 actual engines, including those in the shops at any one time. The engine crews consist of an engineman, fireman and three or sometimes four switchmen to each engine. There are 24 yardmasters employed (including general yardmasters, yardmasters and assistant yardmasters), 40 switch tenders and 80 yard clerks or markers. In the 40th avenue yard there are 34 engine crews, 17 working days and 17, nights. Eight of the 16 transfer crews work out of 40th avenue. The Wisconsin division yard force there is composed of one general yardmaster, 11 yardmasters and assistant yardmasters, 24 yard clerks, four train clerks and eight switch tenders. This includes both day and night forces. It does not include the office force (five men) of the Trainmaster of Freight Terminals, whose office is in the former 40th street depot shown on the map at the junction of the 40th avenue yard with the Galena division, nor the agent's force at 40th avenue, which includes 18 general (bill) clerks, whose whole time is taken up in billing out the cars.

In the Chicago territory the Chicago & North-Western participates in the reciprocal switching agreement. This is an arrangement between the railroads on non-competitive business for a uniform switching charge of \$3 a car. For instance, the North-Western will switch a car from New Orleans for the Illinois Central to one of its industries at that rate. If, however, the Illinois Central delivers to the North-Western a car from some point in Iowa reached by the North-Western, the reciprocal rate does not apply, but a rate of from \$6 to \$8 a car is charged. Thus the location of industries determines the routing of much competitive business. A Milwaukee firm, for example, which ships to an industry in Chicago reached only by the North-Western would hardly find it profitable to ship by any other line. If it should ship by the Chicago, Milwaukee & St. Paul, the \$6 to \$8 switching rate would apply, and this would make the total rate very much higher than the rate by the North-Western. The favorable situation therefore of the North-Western, which was the first road into Chicago and in a sense had its choice in locations, is effective in directly giving to it a large amount of what would otherwise be competitive business. Ordinarily there are regular published switching rates between all points in the terminal district, from a minimum of \$3 a car between nearby points to \$8 a car for switching to Des Plaines. In such service the Chicago & North-Western does not receive freight as a common carrier, but acts simply as the agent of the company or party from whom the property is received to perform the switching service only. Just at present, owing to the extra congestion caused by the track elevation, these regular switching rates have been annulled and the company endeavors to do as little switching service as possible. To take the place of the switching tariff between points such as Des Plaines, Mayfair or Evanston, a regular freight tariff was issued July 16, giving the rates per 100 lbs. for car load lots of different commodities between Chicago and 30 such outlying switching points. These vary from 5¼ cents per 100 lbs. on granite and marble, with a minimum weight of 28,000 lbs., to 1 cent per 100 lbs. for cinders, slag and paving brick, with a minimum weight of 60,000 lbs. The rate of \$3 a car for car-load freight between the railroads in the reciprocal switching agreement and industries which have their own private tracks on the North-Western's terminal, still applies. When such interchange is with belt lines there is an additional charge of \$3 a car to cover the belt charge on loaded and empty cars.

With the completion of the final plan for the Melrose Park yards the Chicago & North-

Western will have, although probably a crowded, yet an effective system of terminal arrangements in Chicago. Unfortunately, in the central part of the city it is almost impossible to handle the existing business. Land is so costly that the present arrangements will probably be used until such time as increased traffic makes it absolutely necessary to increase facilities at whatever cost. The completion of the track elevation work and of the Melrose Park yard should greatly relieve most parts of the Chicago terminal. It is then planned to make up and separate all Galena division freight trains, with the exception of the regular time-freight trains, outside the city, thus relieving to a very great extent the Western avenue yard. The 40th avenue yard, relieved of its temporary occupancy by the Galena division, seems capable for some time at least of handling the business of the Wisconsin and Milwaukee divisions. The completion of the air line low-grade third and fourth tracks all the way to Milwaukee will divert most of the freight and through passenger traffic from the present Milwaukee division, which will be left free to handle the increasingly large suburban business. If all freight trains from those two divisions had to run directly into Grand avenue it is doubtful if the road could be successfully operated, but by the present system of bringing such trains into the city by the back door, the situation has been greatly relieved. What will happen to the terminals of any of the Chicago roads if the city and the traffic keep on growing as they have for the past 20 years is problematical, but whatever changes are to come, the Chicago & North-Western cannot fail to profit by its present exceptionally favorable terminal situation.

American Locomotive Company.

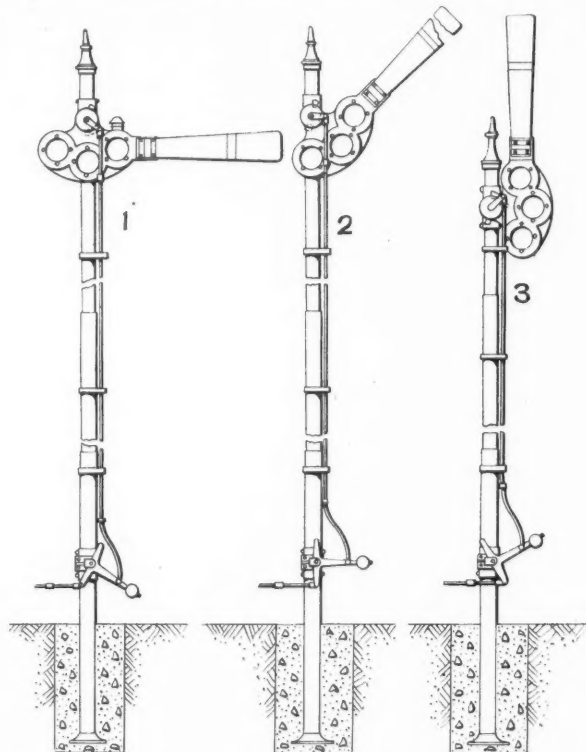
The report for the year ending June 30, 1905, being the fourth year of the company's existence, shows gross earnings of \$24,150,201, a decrease of \$8,918,550 as compared with 1903-1904. This falling off was expected, and, indeed, warning was given of it in the report for last year. The reason is the depression in general business which existed throughout the country from the fall of 1903 to the fall of 1904, this affecting particularly the amount of railroad equipment ordered during that period. It must be understood that up to June 20, 1904, the company was working on old orders received prior to this depression, so that the effects of it did not show in the report for that year, but are evident in the diminished output during the fiscal year just closed. The manufacturing, maintenance and administrative expenses, \$19,796,533, show a corresponding decrease, \$7,608,452, making the net earnings \$4,353,668, a decrease of \$1,310,098. As in former reports, this figure for expenses includes, besides the direct cost of manufacture, all indirect charges against production, a depreciation charge of 20 per cent. of the book value of patterns, dies, etc., and an adjustment of the original price of material in stock to its present market value. The interest on bonds of constituent companies, bills payable, etc., amounted to \$112,186, and the regular 7 per cent. dividend on the \$25,000,000 preferred stock, to \$1,750,000, leaving a surplus of \$2,491,481. The investment in the Montreal works amounted to \$1,883,557, which sum was charged against income, instead of capital account, although it resulted in a permanent addition to property. The net surplus was, therefore, \$607,924. During the year there were additions and betterments to the amount of \$598,204, which have been charged against the extraordinary improvement and betterment fund of \$1,000,000 created in 1904 out of the current surplus of that year. The general balance sheet shows as assets: Cost of property, \$45,657,081; securities owned, \$3,448,131; convertible assets, \$14,680,611; liabilities: preferred stock, \$25,000,000; common stock, \$25,000,000; bonded debt, of constituent companies, \$1,237,500; current liabilities \$6,851,507; extraordinary improvement and betterment fund, \$401,796, and profit and loss, \$5,420,019. The most important financial transaction of the fiscal year just ended was the purchase in January of \$1,962,706 of the \$2,000,000 capital stock of the Rogers Locomotive Works at Paterson, N. J. This cost is to be met from income account and is at present carried in the investment account on the general balance sheet. The report shows that the company proposes to devote a separate shop at the Brooks Works exclusively to the manufacture of the electric shovel, and particular attention is being made to the possibilities of the development of the electric locomotive, trucks for electric service, motor cars and other power vehicles.

It is now some years since the French Parliament ordered an investigation preliminary to a proposed acquisition by the state of two of the six great railroad systems of the country, the Western and the Orleans. The present little state system, consisting chiefly of lines which threatened to become bankrupt, between these two systems, is not a very good field for testing state management; and the acquisition of the Western and the Orleans would be looked upon as a preliminary to a union of all the railroads under the government. Those who advocate this policy, when they reach

positions of responsibility, apparently are frightened by the dangers which it would involve, and this accounts, in large part at least, for the numerous postponements. The present Minister of Public Works, Gauthier, has recently promised to report on the result of his negotiations with the companies next October.

The Loree-Patenall Semaphore.

The Loree-Patenall semaphore, which is spoken of in another column of this paper, and which is of interest at the present time by reason of the active discussion of the upward inclination which is now going on, was designed two years ago (patented July 21, 1903), by Messrs. L. F. Loree, then President of the Baltimore & Ohio, and F. P. J. Patenall, Signal Engineer of that company. The spectacle casting, as shown in the accompanying engraving, is so designed as to cause the signal to return to the stop position whenever it is released or disconnected or broken, without the aid of a counterweight. Accumulations of snow or ice on the blade or casting will,



The Loree-Patenall Semaphore.

of course, increase the tendency of the arm to turn to the horizontal position, a stop being provided to prevent it from falling below that position. While the signal is designed to be inclined upward from the horizontal the inventors call attention to the practicability of turning it downward also, thus making possible the use of five indications.

The Condition of British Shipping.*

We are now well into the second half of the shipbuilding year, and the prospects of the industry are not so bright as they were six months ago. The amount of new work actually on hand on the stocks is not much above that of last year, while the number of orders booked during the last four or five months have been few. This means that as the vessels now on the stocks leave the berths the builders will have nothing like as many to put in their place. Nor is much contracting, even at the best of times, usually done in August, so that unless there is a revived demand in September and October there will be a considerable shortfall of shipbuilding work with which to face the winter. If often happens that when merchant-ship building is slack some of the yards on the Admiralty list are able to give plenty of employment on warship building; but at present, excluding the Government dockyards, there are only 150,000 tons of warships in various stages of construction at private yards, and as regards the Clyde there is only one warship actually on the stocks. The total output of the shipyards this year will be very large, perhaps larger than last year; but prospects of the near future are not bright, however busy many of the yards and relative industrial establishments may be just now.

The pause in the demand for new shipping, which was so active

*Extract from a paper in *The Statist*, London.

at the beginning of the year, has occurred in spite of the fact that costs at present are not at a high level. They have been lower; and perhaps even now they would be lower than they actually are had it not been for the combination among the English and Scotch steelmakers to keep up the prices of ship and boiler plates. It may be admitted that these prices have not been advanced extravagantly—there has always been the fear of American and German competition to prevent that—but there is no doubt they are higher than they would have been in a condition of free and open competition. Still, prices are not so high as to check building, and the absence of demand for new cargo vessels must be attributed to the depressed and discouraging condition of shipping. We have little faith in the conditions being improved by the efforts which shipowners are making to reduce the pressure of international competition. It is claimed that the International Association of Shipowners engaged in the North Sea and Baltic Trades has brought something like order into these trades. This may be, but the Association is not, and can never be, comprehensive, nor can its regulations be made compulsory.

While we sympathize entirely with British shipowners in the adversity of their industry, and would rejoice if they could find a way of improving it, we think they are on the wrong lines. By such combinations they are really playing into the hands of their foreign competitors; just as they do when they sell their second-hand ships at low prices to foreigners, and hasten to build new ones with a larger expenditure of capital, on which they cannot earn a remunerative return because they are undercut in the freight market by their own discarded ships. What would be much more to their advantage would be an international agreement for a universal load line, and for a uniform scale of seaworthiness, so that they may not be handicapped by overlaid and imperfectly equipped vessels (with the consequent economies) sailing under foreign flags.

It seems to us that what British shipowners should now do is to organize, through the Government and by diplomatic methods, an International Maritime Conference for the definite settlement of the vexed questions of loading and seaworthiness. The fact that previous conferences of the kind have been more or less abortive should not deter us from further effort, if we go prepared to show that if a universal basis be not established we shall discriminate in our ports against all vessels which do not comply with the regulations which have been found to be necessary and acceptable in the case of British vessels. As the largest shipowner in the world, we are entitled to take up this position, and if we insist on uniformity we can secure it. Overloading may or may not be so common on foreign ships as is commonly supposed. But it certainly exists, and as long as it exists it is a menace to human life, as well as an injury to British shipping and to all shipping conducted on prudent lines. A good deal is to be said against the desire of British shipowners for the Government to be represented at the international conferences for the consideration and adjustment of shipowners' liability in respect of collisions—at least in so far as these conferences have hitherto gone, although the time is approaching when the Governmental arm may be intervened—but we know of nothing that can be said against the Government taking part, in a resolute spirit, in an international conference for the regulation of loading and seaworthiness.

With regard to the condition of shipping, attention may be recalled to some remarks made the other day by Mr. M. M. Rodocanachi, as Chairman, at the annual meeting of the London Marine Steamship Company, Limited: "Abundance of tonnage, and the consequent reduction in freights, is not the only evil by which shipowners are at present beset. They are also adversely affected by customs of the port, terms of charter, and general working arrangements, so that even when the much-longed-for improvement may arrive there will be a lot of leeway to pick up. The depression has been so severe and prolonged, with the unfortunate consequences so far-reaching, that it will take some time to get the shipping trade back on the lines of some years ago." But, he added, "The one gratifying feature is that the cost of construction has ceased declining, and has come to a standstill. This decline in itself has given cause for serious anxiety in the past, as, besides bad freights, steamship owners had also to reckon with a continued falling off in the value of comparatively new steamers." We are not sure that the cessation of decline in the cost of construction is such a gratifying feature as is indicated, although it may be to some extent reassuring to present owners. But what as to the prospective improvement? There is none, according to Messrs. H. E. Moss & Co., for these well-known authorities, in their last freight report, say: "We are sorry that we cannot report any improvement in the shipping trade, nor can we see anything to justify the belief of an improvement in the future. There is too much seeking tonnage everywhere, and the large number of steamers building seems to us likely to prevent any considerable improvement in freights." On the whole, then, it would seem that, however much the decline in the orders for new ships may be lamented by shipbuilders, and however much we may regret it on account of the various industries and workers concerned, it is in the interest of the over-burdened shipping trade. This is not the less true if it be the case that

large cargo steamers now cost about £5 12s. 6d. per ton of dead-weight capacity to build, whilst a good many of the steamers now being built or recently launched were contracted at £5 10s., and even down to £5 5s., per ton, dead-weight capacity.

Train Accidents in the United States in August.¹

dn, 1st, Grand Rapids & Indiana, Kendallville, Ind., a passenger train was derailed at a derailing switch approaching the crossing of the Lake Shore & Michigan Southern, and the engine and first three cars were ditched. The engineman was injured seriously and 13 passengers slightly.

dr, 3d, Baltimore & Ohio, Foustwell, Pa., a passenger train was derailed by a broken rail and the baggage car and smoking car fell down a bank. The conductor and eight passengers were injured.

rc, 4th, 2 a.m., Delaware & Hudson, Sidney, N. Y., a passenger train ran into the rear of a preceding freight and the engineman was killed. The freight had been unexpectedly detained and it is said the flagman did not go back far enough.

dn, 4th, Central of New Jersey, Bayonne, N. J., an eastbound passenger train running at moderate speed was derailed at an unfinished switch which was left in an unsafe position, and the engine fell off the side of the trestle bridge, on which the accident occurred, and was partly submerged. The engineman was killed. This accident was reported in the *Railroad Gazette* of August 18.

bc, 6th, Maryland, Delaware & Virginia, Centreville, Md., an empty engine, accidentally or maliciously started, ran uncontrolled several miles and finally collided with passenger train No. 3, wrecking both engines. The engineman and fireman were injured, the former fatally.

xc, 6th, New York Central & Hudson River, Savannah, N. Y., an eastbound freight train collided with a string of empty freight cars, and the engine and several cars were wrecked. The engineman was killed.

xc, 8th, Atchison, Topeka & Santa Fe, Emporia, Kan., a switching engine collided with the caboose of a stock train standing near the station, and 10 persons, mostly drovers in the caboose, were injured.

unf, 8th, Augusta Southern, Warthen, Ga., passenger train No. 27 was derailed by a landslide and the engine was overturned. Four passengers and three trainmen were injured.

dn, 10th, West Virginia Central & Pittsburg, Elkins, W. Va., a freight train descending a steep grade became uncontrollable and was derailed, and 20 cars were wrecked. The engineman and one brakeman were killed and two other trainmen were injured.

unx, 10th, Chicago, Rock Island & Pacific, Limon Junction, Colo., a freight train was derailed and two men, said to have been on the cars without right, were killed.

11th, Southern Railway, Lynchburg, Va., the tender of the engine of passenger train No. 29 was derailed near the bridge over the James river, and, with the first four cars, fell against the trusses of the bridge.

unx, 12th, International & Great Northern, Navasota, Tex., a freight train was derailed and the engine and three cars were ditched. The fireman and two other trainmen were injured, the fireman probably fatally.

bc, 13th, 1 a.m., New York, Chicago & St. Louis, Vermillion, Ohio, butting collision between an eastbound passenger train and a westbound freight, the freight having run several hundred feet beyond the switch at which the trains should have met. Both engines and several cars were wrecked and in the first passenger car of the passenger train 11 passengers were killed; 25 passengers and trainmen were injured, some of them fatally. The passenger engineman was killed. The conductor of the freight attempted to stop the train as soon as he saw that it was not being stopped by the engineman at the right point, but he was unable to act in time to prevent the collision.

bc, 13th, Wabash road, Fremont, Ohio, butting collision of freight trains, wrecking both engines and 12 cars. Two brakemen were killed. It is said that the westbound train had run eight miles beyond the appointed meeting station.

unx, 13th, Atchison, Topeka & Santa Fe, Lewis, Kan., west-

¹Accidents in which injuries are few or slight and the money loss is apparently small, will, as a rule, be omitted from this list. The official accident record, published by the Interstate Commerce Commission quarterly, is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Deraillments; defects of roadway.
eq	Deraillments; defects of equipment.
dn	Deraillments; negligence in operating.
unf	Deraillments; unforeseen obstruction.
unx	Deraillments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

bound passenger train No. 9 was derailed, and the fireman and one brakeman were killed. The engineman was fatally injured.

xc, 14th, Chesapeake & Ohio, Garrison, Ky., passenger train No. 2 ran over a misplaced switch and collided with an engine and some cars standing on a side track. The engineman and fireman of the passenger train were injured, probably fatally. Two passengers were also injured.

xc, 15th, Rushville, Ind., an eastbound passenger train of the Cincinnati, Hamilton & Dayton ran into a southbound freight of the Pennsylvania Lines, at the crossing of the two roads, wrecking the freight engine and knocking it over into the passenger station, demolishing the baggage room and men's waiting-room. Seven passengers and one trainman were injured.

dr, 15th, Houston, East & West Texas, Urbana, Tex., passenger train No. 1 was derailed and the engine was overturned, ditching the mail car and express car; engineman and fireman injured.

dr, 15th, Houston & Texas Central, Sherman, Tex., the rear car of a passenger train was derailed at a point where the track had been distorted by solar heat, and four passengers were injured.

rc, 16th, Atchison, Topeka & Santa Fe, Corona, Cal., a freight train ran into the caboose of a work train; six employees were killed and 15 injured, many of them fatally.

unf, 16th, night, Baltimore & Ohio Southwestern, Cincinnati, Ohio, a passenger train ran into a street car, crossing the track, and demolished it, killing three of its 13 passengers and injuring the other 10. The conductor and motorman escaped. The locomotive and mail car of the passenger train were derailed and ran into a garden, wrecking three small buildings.

unx, 16th, Pennsylvania Lines, Frazeyburg, Ohio, a freight train was derailed and 11 cars fell down a bank; one brakeman was killed.

unx, 16th, Pennsylvania road, Hydetown, Pa., a passenger train was derailed and one of the two engines and seven cars were ditched; two passengers injured.

xc, 17th, 9 p.m., Beaumont, Tex., a freight train of the Southern Pacific ran into a freight of the Gulf & Interstate at the crossing of the two roads; two employees injured.

fdn, 17th, Atlantic Coast Line (Norfolk District), Bruce, Va., an excursion train ran into an open draw and the engine and two cars fell into the west branch of Elizabeth river. Fifteen passengers were drowned and about 25 injured. The engineman jumped off, struck a log raft and was seriously injured, being at this writing still unable to explain his error. It appears that there is no derailing switch at the draw and that according to rule the train should have been stopped before crossing the draw. This stop was not made, though there is a stop sign half a mile back and another one 300 ft. back. The reports say that the engineman was making his first trip over this line. This accident was reported in the *Railroad Gazette* of September 1, General News Section, page 67. Two coroners' juries investigated this disaster; both find the railroad company negligent in entrusting the train to an engineman not fully acquainted with the road.

rc, 18th, Delaware & Hudson, Fort Edward, N. Y., rear collision of passenger trains; 20 passengers injured.

rc, 19th, Chicago & North-Western, Waukegan, Ill., a freight train standing in the yard was run into at the rear by a following freight, wrecking one engine and 12 cars. One brakeman of the standing train and the engineman and fireman of the other train were killed.

dn, 19th, Chicago, Rock Island & Pacific, South McAlester, Ind. T., a passenger train was derailed by a misplaced switch and two passengers and two mail clerks were injured.

unx, 19th, St. Louis & San Francisco, Cedrom, Ala., eastbound passenger train No. 204 was derailed and several passengers were injured.

xc, 20th, Louisville & Nashville, Gethsemane, Ky., collision between northbound and southbound freight trains, one of which was on the side track but not fully clear of the main line, badly damaging four engines and wrecking one car. One engineman was killed and two other trainmen were injured.

unx, 20th, Southern Railway, Demopolis, Ala., a westbound passenger train was derailed and several cars fell down a bank, the baggage car being overturned. Thirty passengers were injured.

xc, 21st, 10 p.m., Southern Railway, near Salisbury, N. C., a runaway locomotive, unattended, collided with a freight train, damaging both engines. The engineman was killed and the fireman injured. The accounts indicate that the runaway engine had been started maliciously.

dn, 21st, 1 a.m., Lake Shore & Michigan Southern, Vulcan, Ohio, a freight train was derailed and ditched at a derailing switch; the engineman was killed and the fireman and one brakeman were injured.

unf, 21st, St. Louis, Iron Mountain & Southern, Nettleton, Ark., a work train was derailed by running over a cow, and several cars were wrecked. One man was killed and two were injured.

rc, 22d, Pennsylvania road, Howellsville, Pa., rear collision of freight trains; two trainmen injured.

dn, 22d, Middlesboro, Ky., a freight train of the Southern Rail-

way consisting of 38 cars of coal became uncontrollable on a descending grade and, after running uncontrolled several miles, was derailed, the train first having broken into two parts. One of the parts, after jumping the track, ran into and demolished six cottages, killing a child in one of them. The engineman stuck to the engine until it was wrecked, and was fatally injured.

bc, 23d, 1 a.m., Union Pacific, Rossville, Kan., butting collision of freight trains. Three trainmen were killed and two injured.

unf, 23d, Charleston & Western Carolina, Barksdale, S. C., a freight train was derailed and seven cars were wrecked. The fireman was killed and the engineman was injured. It is believed that the derailment was due to a malicious obstruction.

eq, 25th, Pennsylvania road, Bainbridge, Pa., a westbound freight train was derailed, wrecking many cars, some of which fell upon the adjoining track. An eastbound freight train ran into the wreck and its engine was overturned and thrown into a canal, injuring four trainmen. It is said that the first derailment was due to the sudden stoppage of the train in consequence of the rupture of an air hose.

rc, 26th, Toledo, St. Louis & Western, Van Buren, Ind., a freight train ran into the rear of a preceding freight, wrecking the engine, caboose and two cars; three trainmen were injured.

xc, 26th, 8 p.m., New York, New Haven & Hartford, Bridgeport, Conn., a freight train ran into another at a cross-over on the viaduct, wrecking two engines and 25 cars. One fireman was fatally injured.

*unf, 26th, 11 p.m., Seaboard Air Line, Calhoun Falls, Ga., a freight train was derailed at a switch which had been maliciously loosened, and nine cars were wrecked and burnt up. One employee was killed and three were injured.

xc, 28th, 1 a.m., Pittsburg, Cincinnati, Chicago & St. Louis, Logansport, Ind., an excursion passenger train collided with a freight train in the yard, and the engine was overturned and the first two cars wrecked. The engineman and fireman were killed and several passengers were injured.

unx, 28th, Central Vermont, Williamsville, Vt., an engine running backward was derailed and tumbled down a bank. The engineman was fatally injured.

unx, 29th, 1 a.m., Chesapeake & Ohio, Long Run, Ky., the caboose of freight train No. 99, running at moderate speed, was derailed and fell down a bank. The flagman and the fireman, riding in the caboose, were injured.

29th, Lake Erie & Western, Kingsland, Ind., a freight train was derailed at the derailing switch approaching the crossing of the Chicago & Erie and the engine and one car were ditched. The derailment was due to the opening of the derailing switch immediately in front of the train, the signalman having decided to do this to prevent the freight from running into a passenger train on the other road which was approaching the crossing at uncontrollable speed.

unx, 30th, Southern Railway, Augusta, Ga., a passenger car in a passenger train, moving through Washington street at low speed, was derailed at a switch and overturned. A quarantine inspector was killed and a flagman on the ground was fatally injured.

xc, 31st, 1 a.m., Charleston & Western Carolina, Laurens, S. C., freight train No. 14 broke in two and the rear portion afterward ran into the forward one, wrecking several cars. One man was killed.

Foreign Railroad Notes.

The management of the Prussian State Railroads has for some years made provision for special care and treatment of cases of consumption among its employees, who have hospitals provided in favorable locations. These have been found very effective, and now the Minister of Public Works has given instructions which will extend the care given to employees to consumptive members of their families.

The coal shipments from the mines in Germany for the first half of this year were 3,869,095 ten-ton carloads, which is nearly 4 per cent. less than last year. A strike in the Ruhr district, which shipped 70 per cent. of the whole last year, reduced its shipments more than 10 per cent., and this was not made good by the increased shipments from Siberian and Saar mines. Imports have increased, and the indications are that the coal consuming industries have been on the whole just about as active as last year.

A man digging a ditch alongside a railroad in Germany was hit and partly disabled by a bottle which some careless person threw out of a car window. He brought suit for damages against the railroad. The court which first tried the case decided for the railroad; on appeal, the decision was for the injured man; appeal to the Imperial court resulted in the reversal of this decision. Notices in the car forbade throwing things out of the window, and the point contested was whether the railroad had done all that it properly could to prevent such acts.

GENERAL NEWS SECTION

NOTES.

The Baltimore & Ohio announces that henceforth baggage insurance tickets will be sold by the agents and baggagemen of that company at its principal offices. The insurance covers losses of all kinds from the time the baggage leaves its home.

The Canadian Railway Commission, acting on the protest of the Canadian Pacific in the matter of the location of the proposed Grand Trunk Pacific route too near the C. P. west of Portage la Prairie, has held that the matter is not within its jurisdiction, since the route had been approved by the Minister of Railways.

The State of Indiana now prescribes by law the rates which railroads may charge for excess baggage; and for distances where the passenger fare is less than \$1.34 these rates are much lower than those now charged by railroads. It is said that the Wabash has issued a new tariff conforming to the law but that no other road has yet taken action.

Rumors of the retirement of Mr. Cassatt from the presidency of the Pennsylvania are not uncommon and are now again revived. It is said that he will present his resignation at the next annual meeting in accordance with the Pennsylvania rule that all employees shall be retired at the age of 70; but this rumor is unconvincing, since Mr. Cassatt was born in 1839 and will celebrate his sixty-sixth birthday on the eighth of next December.

Counterfeit pay checks of the Baltimore & Ohio have recently been discovered at Washington, Ind., and at Cincinnati, amounting to \$2,433. An officer of the road says that there is no reason to believe that anyone connected with the company had anything to do with the forgeries. The work appears to have been done by skilful and experienced counterfeiters.

The Grand Trunk Railway of Canada, in furtherance of its plans for getting the most possible benefit out of its apprenticeship system, has offered to apprentices and other employees under 21 years of age two free scholarships in the School of Applied Science of McGill University. The scholarships are to be granted on the basis of competitive examinations.

Mr. E. P. Bacon, of Milwaukee, has issued a call for a convention to be held at the Auditorium Hotel, Chicago, Oct. 26, to impress upon Congress the extent and persistence of the demand for legislation empowering the Interstate Commerce Commission to make rates; to issue orders prescribing rates which shall go into effect promptly and remain in effect until changed by Congress.

A press dispatch from Lincoln says that the Governor of Nebraska and two other prominent state officers have, in consequence of the action of the Republican State Convention, in adopting an anti-pass plank, returned to the railroads the annual passes which they have held. Other state officers are expected to follow this example, but the Secretary of State declares that the passes which he has he will keep.

At the timber-treating works of the Gulf, Colorado & Santa Fe, at Somerville, Tex., the quantity of creosote used now is about 40,000 gallons a month, and it is said that this plant uses a third of all the creosote used in the United States. The tannin and zinc treatment is no longer used at Somerville. A tank steamer arrived at Galveston September 3 with 2,200,000 gallons of creosote, of which about one-third was for the Somerville plant.

At the Union station in Atlanta, Ga., recently Mr. Etheridge, a lawyer, had to buy a ticket, for which he paid 18 cents, in order to get admission to the train platform to bid good-bye to a friend who was going away. After the train had gone he applied for the redemption of his ticket, but was refused because the ticket had been punched by the gateman. He sued the road and got a verdict for his 18 cents, there being a clause printed on the ticket making it redeemable if not used; but it is said that the case will be appealed.

According to the *Telegraph Age* the experiments made with wireless telegraphy on the Chicago & Alton have developed some interesting facts. It appears that as the trains approached the Mississippi river the increase in the strength of signals became very marked, but when the train entered the truss of the Merchants' Bridge it was found that they died away almost entirely, apparently in consequence of the screening action of the truss. The signals were also stronger when the train was running at right angles to the transmission station. That the radiations followed the course of the river rather than overland was clearly evident. Chicago papers say that the experiments have finally been given up—which spoils

several hundred "news" items, published all over the country, to the effect that the officers of the road expected to use the wireless telegraph as preventive of collisions.

The latest "city" to put forth its iron hand in restriction of the speed of railroad trains is Rush Hill, Mo., which is said to be inhabited by 250 men, women and children; and the people are so determined in their purpose to protect their lives and liberties that the railroad company involved, the Chicago & Alton, has applied for an injunction to restrain the officers of the city from arresting the company's train men. It appears that, by an ordinance recently passed, the rate of speed for all trains is limited to eight miles an hour; but the train men did not comply with it, and they were arrested and fined. A limit was also placed on the time that a locomotive or a hand car might remain on the tracks within the city limits. The railroad company, in applying for the injunction, avers that its tracks are in the southern part of the city, and that the occupants of only one house are required to cross the tracks to get into the business center of the town; and that therefore to cause any detrimental obstruction of the streets is impossible.

The roads from New York and those from New Orleans have once more reached an agreement to end the sugar and coffee rate wars, and new tariffs are announced to go into effect on Oct. 7,—provided somebody does not back out. The basis agreed upon for sugar is as follows:

To Missouri River points, from New Orleans, 34 cents.
To Missouri River points, from New York (all rail), 45 cents.
To Missouri River points, from N. Y. (lake and rail), 42 cents.
From New Orleans to St. Paul, 30 cents.
From New York to St. Paul (all rail), 33 cents.
From New York to St. Paul (lake and rail), 30 cents.

The usual differentials will be allowed on Phila. shipments.
The rates agreed upon for coffee are:
From New Orleans to Missouri River, 35 cents.
From New York to Missouri River (all rail), 43 cents.
From New York to Missouri River (lake and rail), 38 cents.
From New York to St. Paul (all rail), 40 cents.
From New Orleans to St. Paul (open navigation), 35 cents.
From New Orleans to St. Paul (closed navigation), 40 cents.

A Dried-Up Pool.

A pool of the Kansas City roads, which has been in existence for several months, was suddenly abandoned last week at the first intimation that the millers might cause trouble by bringing the matter to the attention of the Interstate Commerce Commission as a violation of the Elkins law and the Sherman anti-trust act. The fact became known yesterday when it was announced that G. A. Kimball had closed his Kansas City office and resumed his work with the Western Trunk Line Association. Kimball was known as joint contracting agent of all lines entering Kansas City which handled foreign shipments of grain. As a matter of fact, he had the routing of all the flour shipped out of Kansas City, seeing that each road secured its proportion, and it was only last month that the railroads gave him authority over grain shipments. The joint agency was established on account of the rate wars that have been disturbing the grain business. The Alton and the Milwaukee & St. Paul were not in the pool.—*Exchange*.

The Central Mileage Ticket.

All the prominent Michigan railroads except the Grand Trunk have been admitted to membership in the mileage bureau of the Central Passenger Association, and on Oct. 1 will begin using the Central Association's interchangeable mileage book. The companies are the Ann Arbor, the Michigan Central, the Pere Marquette, the Grand Rapids & Indiana, and the Detroit & Mackinac; also the Detroit & Cleveland Navigation Company, and the Detroit & Buffalo Steamboat Company. The interchangeable mileage books will then be good over 30 transportation lines, with an aggregate of over 28,000 miles. If the Grand Trunk joins, it will be good over nearly 30,000, including every railroad from Chicago and St. Louis to Buffalo and Pittsburg, and will be the only form of mileage ticket in that territory.

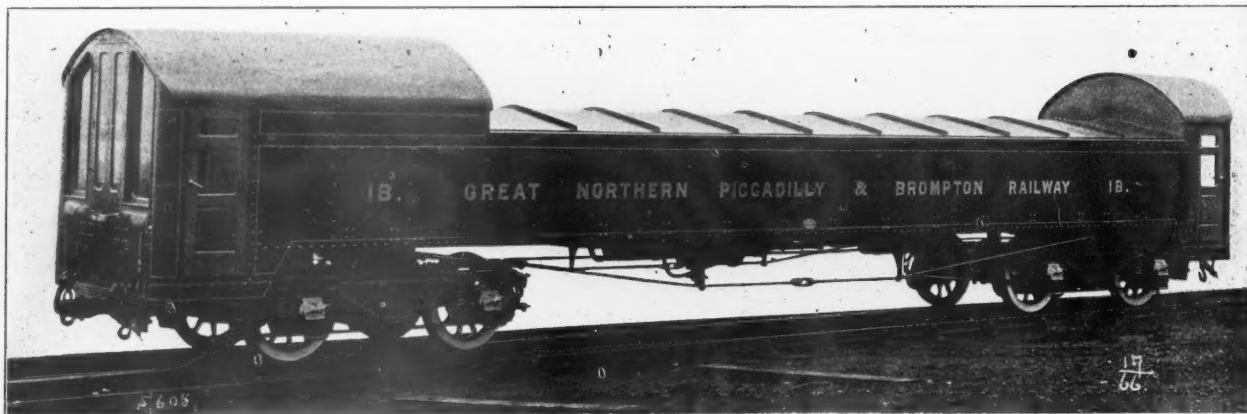
Since the bureau was organized eight years ago over \$54,000,000 worth of mileage books have been sold, each book selling for \$30 and a rebate of \$10 being paid to the purchaser after he has traveled 1,000 miles. The average trip is about 40 miles and the longest possible trip 523 miles, from Chicago to Buffalo. A remarkable record made by the bureau is that since Sept. 1, 1897, it has disbursed in rebates of \$10 each amounting to over \$18,000,000, without the loss of a dollar. Checks for the rebates have been sent to every part of the United States and Canada, and Mexico.

Storage Battery Locomotive for a London Underground Railway.

The accompanying illustration shows one of two storage battery locomotives built by Hurst, Nelson & Co., Ltd., of Motherwell, near Glasgow, for the Great Northern, Piccadilly & Brompton Railway; one of the Yerkes underground electric railways now in course of construction in London. The main floor of the locomotive is of steel girders and plates, and upon this is built up a casing as shown. The length of the locomotive, over buffers, is 50 ft. 6 in., and its width is 8 ft. A driver's cab is provided at each end, and these are each fitted with a British Thomson-Houston

The Witham Accident.

The derailment of an express train at Witham, on the Great Eastern of England Sept. 1, killing 10 persons and injuring 45, is still classed as unexplained. Witham is 39 miles from London. Between the platforms at the London end of the station, the locomotive and the first three coaches broke away from the remainder of the train; and the third coach from the engine turned over across the up line and caught fire, being eventually completely destroyed. The locomotive proceeded some distance alone along the down line, and the train was badly scattered. A porter in the sta-

**Storage Battery Locomotive for a London Underground Railway.**

master controller, and one of the cabs is also provided with accommodations for the electrical and brake apparatus. There are no collector shoes, the power being obtained from the battery; the main battery compartment contains about 36 tons of accumulators. The equipment consists of 80 cells, each cell having 21 plates. The normal discharge current is 179 amperes with a maximum emergency load of 800 amperes. The locomotives weigh about 64 tons each, and the free running speed, when hauling a train-load of 60 tons, varies between 7 and 9½ m.p.h. The batteries are capable of storing sufficient energy to operate for a whole day without recharging.

These locomotives were primarily designed for the purpose of hauling cars used in the conveyance of excavated material, and also for material required in the construction of the tunnels of the Great Northern, Piccadilly & Brompton "tube" line. They are equipped with automatic couplers and Westinghouse air-brakes and hand brakes.

Inclusive Fares.

One feature of British railroad practice this year has been the introduction of excursions at special inclusive fares which include meals on the train as well as transportation. The Great Central recently issued special return tickets from London to Doncaster, 180 miles (for the races) at inclusive prices, including lunch, tea and dinner at 33s. 6d. first class and 18s. 6d. third class.

New Equipment for the "Overland Limited."

New equipment is being delivered by the Pullman Company to the Chicago & North-Western for the "Overland Limited," the fast three-day train from Chicago to the Pacific Coast. The sleeping cars are of the latest design, and maximum size, and are electric-lighted. There are ten sections, a drawing room and two private compartments in each of the cars intended for the Chicago-San Francisco run. Similar sleepers having 12 sections, one drawing room and one compartment, will run to Portland. These sleeping cars, together with dining cars and composite buffet-smoking, library and observation cars, constitute the equipment of the train. The "Overland Limited" now connects by the San Pedro, Los Angeles & Salt Lake with a new short line to Los Angeles.

Proposed Railroad in Brazil.

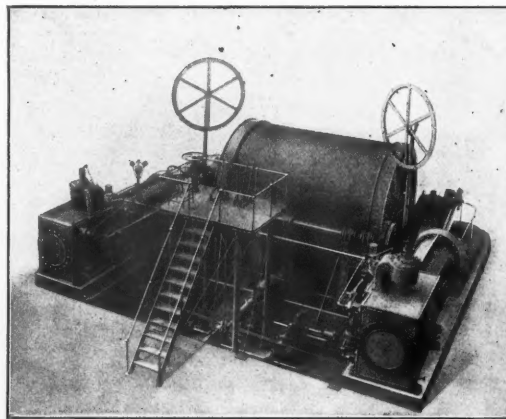
It is reported that, under the auspices of the directors of the North German Lloyd and Hamburg South American Line, a company with a capital of 23,000,000 marks, backed by some prominent German banks, had been formed in Hamburg for the purpose of constructing a railroad from Blumenau to Hammonia (a distance of 75 kilometers), in which the German colonies are situated. From Hammonia the projected line will go directly north to Rio Negro, on the frontier of the State of Parana, traversing the large territories acquired by a German land association called Hansa, to connect with the Parana railway, and also a line that is projected from the State of Rio Grande do Sul. Another branch is to extend from Hammonia to Coritibanos, about 200 kilometers, which later on is intended to be connected with a post on the frontier of the State of Rio Grande do Sul.

tion was killed. The four last coaches suffered but little damage, and the locomotive did not leave the rails at all.

The theory of a broken axle, at first advanced, has been found untenable, as a thorough examination of the wheels and trucks proved all the axles to be sound. Both at the approach to the station, and in the station itself the line is straight, and no flaw in the permanent way, or obstacle on the track has been discovered. There are no facing points, but there is a crossing with four frogs. Lieut.-Col. von Donop has been appointed by the Board of Trade to conduct the official inquiry.

A Large Hoisting Engine for the Centennial Copper Company.

A hoisting engine of very heavy design is being installed by the Centennial Copper Co., Calumet, Mich. It is of the direct acting type and consists of two 36-in. x 60-in. simple, reversible Corliss engines of the heavy duty type, connected to a straight-faced drum, 15 ft. in diameter by 15 ft. winding face. The drum is grooved for 1½ in. wire rope and is keyed direct to the engine shaft. The plant is designed to hoist from a vertical depth of 5,000 ft. at a rate of 4,000 ft. a minute, with a boiler pressure of 150 lbs. The

**A Large Hoisting Engine for the Centennial Copper Company.**

reversible engine is of novel design, and may be worked by either steam or air. The brake mechanism is arranged for steam, hand or gravity operation, with independent control in each case. The main throttles are on the cylinders, moved by hand from the engineer's platform, which is elevated to a point higher than the drum. The dial indicators are provided with fast and slow moving pointers. A sensitive and powerful automatic stop and throttle-closing device is another important feature, diminishing the danger of over-winding with the high speed used. This plant is complete in detail, being equipped with the most improved auxiliaries. It was built by the Sullivan Machinery Co., Chicago.

Officers Elected by the Road and Track Supply Association.

At a business meeting of the Road and Track Supply Association, held at Niagara Falls, September 14, the following officers were elected for the ensuing year: President, W. E. Clark (Continuous Rail Joint Co.); Vice-President, John McKinnion (Kalamazoo Railway Supply Co.); Secretary and Treasurer, John M. Reynolds (*Railway Age*); members of Executive Committee, Joseph H. Martin (Hussey-Binns Shovel Co.), William Goldie (William Goldie, Jr., Co.), W. F. Schleiter (Dilworth, Porter & Co.), C. W. Reineohl (Pennsylvania Steel Co.), F. A. Poor (Weber Railway Joint Mfg. Co.), and George Stanton (Cleveland Frog & Crossing Co.).

Floods in Kansas and Missouri.

Despatches from Kansas City, Sept. 18, report floods in the Kaw and other rivers. The Missouri Pacific has lost two bridges near Syracuse, Mo. The Missouri, Kansas & Texas steel bridge, 150 ft. long, near Ottumwa, Mo., has been carried away, also the Missouri Pacific's 180-ft. bridge over the Lamine river at Ottumwa. Despatches from Jefferson City report the Missouri Pacific as completely tied up in that region by slides and washouts. Near Ironton, Mo., a passenger train of the Iron Mountain road was wrecked at a washout and three persons were killed.

Powerful Testing Machine at University of Illinois.

The laboratory of applied mechanics of the University of Illinois at Urbana has been installing some new apparatus, among which is a powerful machine for testing the strength of materials. It has a capacity of 600,000 lbs., and is probably the largest machine of this kind possessed by any educational institution. This department of the university does testing for several railroads and for other corporations.

The New President of the Allis-Chalmers Co.

Mr. Walter H. Whiteside, elected President of the Allis-Chalmers Company, does not



Walter H. Whiteside.

mean a change in the policy of the company, for Mr. Whiteside has been, during the absence in Europe since April last of his predecessor in office, in full charge of operation. Mr. Whiteside has been with the Allis-Chalmers interests since July, 1904, when he was appointed General Manager of Sales. The company had just taken over The Bullock Electric Company, and Mr. Whiteside had not merely to become familiar with all the intricacies of the company's exceedingly varied products, but the new interests and the old had to be consolidated. The increase in the volume of the company's business and the re-opening of the old South Foundry at Milwaukee testify to his success. Mr. Whiteside is a member of the American Institute of Electrical Engineers and of the Engineers' and other clubs.

Manufacturing and Business.

J. B. Cowen has been appointed sales manager of The General Storage Battery Co., New York.

The Sanborn Company, 1030 Old Colony Building, Chicago, is a new company formed to deal in steam and electric railroad supplies.

Eugene Holcomb has recently been appointed as manager of the Foreign Department of the Allis-Chalmers Company, with headquarters at the general offices, Milwaukee, Wis.

In commemoration of its 50th anniversary, the Crane Company, Chicago, is distributing a memento in the form of an elephant, 50,000 of which are being made by the company.

J. G. White & Co., New York, have secured the services of J. F. Witmer, of Buffalo. Mr. Witmer will take charge of all work in connection with hydraulic engineering matters in foreign fields.

Distinguished recognition has been conferred upon Waddell & Hedrick, Consulting Engineers, Kansas City, Mo., by the Government of the Province of British Columbia for the satisfactory construction and completion of the new Fraser river bridge at New Westminster.

The Pittsburg Steamship Company has ordered from the American Shipbuilding Company, South Chicago, two lake vessels which will have the following dimensions each: Length over all, 600 ft.; keel, 583 ft.; beam, 58 ft.; depth, 32 ft. On a draft of 20 ft. they

will carry about 12,000 tons. They will cost \$450,000 each, and be delivered next spring.

The Detroit Lubricator Co. and the Detroit Seamless Steel Tubes Co., gave for the Traveling Engineers' Association, which met in Detroit last week, a boat ride from Detroit to the St. Clair Flats with supper on board, returning in the evening. There were about 250 guests.

Archer C. Stites, for many years Western Representative of the Phoenix Bridge Company, Philadelphia, died at Monteagle, Tenn., on August 27th. Mr. Stites was a graduate of Rensselaer Polytechnic Institute of the class of 1887, and was a member of the American Society of Civil Engineers.

The Westinghouse Brake Co., Limited, has secured the exclusive rights, under the Morse Chain patents, to manufacture and sell the Morse Rucker joint silent high-speed chains in Great Britain and on the continent of Europe, and has just completed a new building at York Road for the manufacture of these chains.

The St. Louis Expanded Metal Fireproofing Co., St. Louis, Mo., has issued a notice to the trade warning against the use of certain bars which are infringements of its corrugated bar patents. These patents cover all bars that can be rolled, having ribs or depressions, the sides of which make an angle with a plane at right angles to the axis of the bar less than the angle of friction between the concrete and the metal. The shape of the bar, whether circular, elliptical, square or flat, is immaterial.

The Calumet Supply Co., 411 Dearborn street, Chicago, is a newly incorporated concern which will handle packings, small tools and other railroad and mill supplies. It will also do a general power plant and factory equipment business. Exclusive selling agencies in that market for several makers of steam pumps, feed-water heaters, lubricator pumps and engine room specialties have been secured. J. S. Ward is President and General Manager, and Frank M. Gilmore, Vice-President and Treasurer. Both have been identified with the machinery and supply trade for the past 15 years.

The Sullivan Machinery Company, Chicago, has added two branch offices, one at Knoxville, Tenn., and one at Joplin, Mo. The Knoxville office, in the Houston Building, is in charge of E. L. Thomas, for several years connected with the New York branch. Rock drills, stone channelers and quarrying machinery are carried in stock. S. A. Allison, who has been the representative at Joplin for the past two years, becomes district manager at that point. A stock of Sullivan compressors, rock drills and duplicate parts and supplies is carried at the warehouse at Joplin. The new office is in the Keystone Hotel block, corner of Fourth street and Virginia avenue.

During the past week the control and management of the National Car Wheel Company passed into the hands of James D. Rhodes, of Pittsburg, Pa., and William F. Bonnell, of Cleveland. This company owns and operates four plants, one at Pittsburg, one at Cleveland, one at Sayre, Pa., and one at Rochester, N. Y. Its product is cast iron chilled car wheels, steel tired wheels, grey iron castings and aluminum and brass castings. The works have an annual capacity of 300,000 wheels, and the officers are as follows: James D. Rhodes, President; C. A. Otis, Jr. and William F. Bonnell, Vice-Presidents; George P. Rhodes, Treasurer, and C. A. Maher, Secretary. The Directors are James D. Rhodes, of Pittsburg; George P. Rhodes, of Pittsburg; C. V. Slocum, of Pittsburg; J. C. Holt, Grand Rapids, Mich.; C. A. Otis, Jr., of Cleveland; C. A. Maher, Cleveland; William F. Bonnell, Cleveland; W. T. Goodnow, of Sayre, Pa., and C. T. Chapin, of Rochester, N. Y. C. T. Chapin, the former President of the National Car Wheel Company, remains with the company in a special capacity, with headquarters at Rochester, N. Y.

J. W. Duntley, President of the Chicago Pneumatic Tool Co., recently returned from Europe, bringing news that the Fraserburgh and Berlin factories of the company had been started up and that manufacturing arrangements had been perfected in Russia. All factories are now running with sufficient business to keep them occupied for several months, and the outlook generally is satisfactory. The foreign business promises during the next few years to rival the American business. Recent foreign orders are for several hundred Air-Cooled Duntley electric drills. Among the domestic orders for compressors and tools received recently are the following: Compressor and complete equipment of pneumatic tools for the Western Steel Car & Foundry Company, Hegewisch, Ill.; three compressors each with 750 cu. ft. capacity for the Baltimore & Ohio R. R.; one 2,000-ft. compressor for the Buffalo plant of the American Shipbuilding Co.; one 1,000-ft. compressor for the Huntington shops of the Chesapeake & Ohio R. R.; one 1,200-ft. compressor for the Norfolk & Western R. R.; one 1,225-ft. compressor for the Otis Steel Co., Cleveland, Ohio; one 165-ft. and two 425-ft. compressors for Bartlett & Hayward, Baltimore, Md. A total of 157 Franklin compressors have been sold during the past 90 days, and it appears that the pneumatic tool business promises well for the balance of the year.

Iron and Steel.

The United States Steel Corporation is at present running nearly all of its mills and is planning to have its idle mills go into operation early next month.

Billets and bars are so scarce in the Pittsburgh district that independent mills have asked prices from Welsh and German mills on billets and bars to keep the sheet and tin plate mills busy. Recent orders given for rails within four weeks have amounted to 831,000 tons. Only a small percentage of this amount is for 1905 delivery. The New York Central is said to be in the market for 150,000 tons. Orders given were: Pennsylvania, 179,450 tons, divided as follows: United States Steel Corporation, 90,750; Cambria Steel Co., 37,350 tons; Maryland Steel Co., 37,350; Republic Iron & Steel Co., 6,000 tons, and Lackawanna Steel Co., 8,000 tons. Other orders were: Harriman Lines, 107,000; Chicago & North-Western, 70,000 tons; Chicago, Milwaukee & St. Paul, 55,000 tons; Burlington, Atchison and Missouri Pacific, 50,000 tons each; Reading and Atlantic Coast Lines, 15,000 tons each, and other small orders for an additional 30,000 tons. The aggregate is greatly in excess of that of any corresponding period in the past.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

International Railway General Foremen's Association.

This is a new association which was formed in St. Louis the first week in September. It was founded for the mutual education of railroad mechanical foremen, with the object of bettering railroad mechanical service. It is patterned on the lines of the Master Mechanics' Association. Those eligible for membership are superintendents of shops, general foremen, roundhouse foremen, machine shop foremen, and division foremen and their assistants. No member is barred from his privileges as such when promotion or other change comes to him. The association starts out with 230 charter members, of which 222 are active, seven associate and one honorary. The officers are: President, W. H. Graves (C. & A.); First Vice-President, C. A. Swan, Jr. (C. & A.); Second Vice-President, E. F. Fay (U. P.); Third Vice-President, L. R. Laizure (Erie); Fourth Vice-President, W. E. Farrell (Big Four); Secretary-Treasurer, E. C. Cook (*Railway Journal*, St. Louis); Chairman Executive Committee, F. W. Rhuark (Frisco). The next annual meeting will be held in St. Louis beginning May 8, 1906, and continuing until all business is transacted.

Railway Signal Association.

The annual meeting of the Railway Signal Association will be held at Niagara Falls, N. Y., October, 10, 11 and 12; headquarters at the International Hotel. There will be three sessions on the 10th, two on the 11th and one on the 12th. A room will be assigned for the display of exhibits, and it can be occupied by any member from 10 a.m. the 10th to 6 p.m. the 12th. At this meeting the Secretary will show samples of designs for a permanent members' badge. The following preliminary list of topics has been issued:

1. The word "Function." This does not appear to be satisfactory, and it is proposed to make an effort to substitute the word "Unit" for "Function."
2. "What is the best method for adjustment of cost of maintenance, operation and inspection of joint interlocking plants?"
3. Committee No. 2, Circuits for manual block signal systems; report and recommendations.
4. Committee No. 5, Organization of Signal Department; an exhaustive report with recommendations.
5. Report of Committee No. 6, "Cost."
6. Committee No. 8, "Standard Specifications." The committee submits a substitute for table "R" as printed in the 1904 Proceedings. Beginning with paragraph 60 the specifications will be considered for final adoption.
7. Committee No. 12, Signal lamps. This committee makes an exhaustive study of the long-time and one-day burners, and their relative visibility. A number of field tests under varied weather conditions are recorded and recommendations are offered.
8. Committee No. 13, Rubber covered insulated wire; preliminary report and recommendations.
9. Dr. Charles H. Williams, of Boston, will present a paper, "Observation on Signal Lenses."
10. Dr. Wm. Churchill, of Corning, N. Y., paper, "The Roundel Problem."
11. Mr. E. L. Adams (L. S. & M. S.) a paper on "The use of storage batteries for all-electric and other signal devices."
12. Dr. N. M. Black, of Milwaukee, Wis., presents his "Second report of comparative tests of roundels from an Ophthalmologist's standpoint."
13. Mr. J. A. Peabody (C. & N.W.) a paper on "Cost of stopping trains compared with the cost of maintenance, operation and inspection of interlocking plants."

PERSONAL.

—Mr. J. E. Duval has resigned as Accident Inspector of the Dominion Railway Commission of Canada. He has been appointed manager of the recently organized Montreal Car Service Bureau.

—Mr. S. D. McLeish, who was recently appointed Assistant General Passenger Agent of the Cleveland, Cincinnati, Chicago & St. Louis, was born at Evansville, Ind., in 1864. He began his railroad work in 1882 in the Claim department of the Evansville & Terre Haute. He became General Passenger Agent of that road in 1889, and from there he went to the Peoria, Decatur & Evansville.

—Mr. D. Y. Swaty, who has been appointed Assistant Chief Engineer of Maintenance of Way of the Northwest system of the Pennsylvania Lines West, is a graduate of the University of Wisconsin. He began railroad work in August, 1899, as bridge inspector. Later he was draftsman and instrument man in the office of the Chief Engineer of the Pennsylvania Lines West. On January 1, 1903, he was appointed Assistant Chief Engineer of Maintenance of Way on the Southwest system, and on the first of the present month was transferred to his present position on the Northwest system.

—Mr. D. MacPherson, who has been appointed Assistant Chief Engineer to the Commissioners of the (Canadian) Transcontinental Railway, was born at Bath, Ont., in 1858. He graduated from the Royal Military College at Kingston, Ont., in 1880, beginning railroad service, in the same year, as rodman on the Canada Central. From this time to August, 1882, he went through the various grades in a field engineering corps up to engineer in charge of a section of final location and construction. On the latter date, he was appointed Assistant Engineer of the Eastern division, and four years later Division Engineer of Maintenance of Way, which position he held until his present appointment.

—Mr. Frank Lee, who has been appointed Engineer of the Central division of the Canadian Pacific, is a graduate of the Sheffield Scientific School of Yale University in the class of 1894. He entered railroad service that year as rodman and draftsman on the Trinidad Government Railways. From May, 1896, to September, 1901, he was in the Engineering department of the Chicago & North-Western. He was then appointed Assistant Signal Engineer, and in November, 1902, Signal Engineer of the Canadian Pacific. In January, 1904, he was made Assistant Engineer of the Western division, and, in August of the same year, Assistant Engineer of the Western lines, remaining in that office until appointed to his present position.

—Mr. W. P. Appleyard, Superintendent of Equipment of the Pullman Co., was killed in Chicago on the evening of September 19 by an incoming train at the Sixty-third street station of the Illinois Central. Mr. Appleyard was 49 years old and was one of the best known car builders in the country. He has taken a prominent part in the Master Car Builders' Association, being President for 1904-1905, and has served on many important committees. He was a valued member of the committee which supervised the 1903 edition of the Car Builders' Dictionary. He was educated at Notre Dame University at South Bend, Ind., studying engineering and architecture. Two years after graduating, he went into business with his father, who was a contractor and who built the State House at Lansing, Mich. He then followed his profession as an engineer and architect until 1888, when he went to the Pullman Co. as Mechanical Inspector and later as Superintendent of Repairs. He remained with the Pullman Co. until 1893, when he went to the New Haven road. Here he was put in charge of the car shops at Boston with the title of General Foreman of the Car department of the Old Colony system. In 1895 he was promoted to the superintendency of the Car department of the whole road and held that position, with the title of Master Car Builder, until February 1, 1904, when he returned to the Pullman Co., being put in charge of maintenance of equipment at the Pullman, Denver, St. Louis, Wilmington and Buffalo shops, his headquarters being in the Chicago office.

ELECTIONS AND APPOINTMENTS.

Arkansas Western.—W. Coughlin has been appointed General Manager; E. E. Smythe, General Freight Agent, and S. G. Warner, General Passenger Agent of this new road.

Atchison, Topeka & Santa Fe.—James Kurn, trainmaster at Pueblo, Colo., has been appointed Division Superintendent with headquarters at Wellington, Kan., succeeding L. U. Morris, resigned.

Atlanta & West Point.—W. E. Knox, hitherto General Agent of the Alabama Mineral division at Anniston, Ala., has been appointed General Freight Agent of the Atlanta & West Point and the Western of Alabama with office at Montgomery, Ala., succeeding A. R. Smith, recently promoted.

Canadian Pacific.—O. O. Winter, Division Superintendent at Fort William, Ont., has resigned.

Chicago & Alton.—C. A. King, First Assistant General Freight Agent at Chicago, has been appointed General Freight Agent, succeeding Frederick Wann, resigned. R. D. Yoakum, Assistant General Freight Agent at St. Louis, succeeds Mr. King. C. J. Chisam, Assistant General Freight Agent at Peoria, Ill., succeeds Mr. Yoakum. G. W. Quackenbush, Assistant General Freight Agent at Chicago, succeeds Mr. Chisam.

G. L. McDonald has been appointed Signal Engineer with headquarters at Bloomington, Ill.

Chicago Great Western.—H. W. Church, Engineer of the Northwest division, has resigned. E. M. Grime, Division Engineer at Clarion, Iowa, succeeds Mr. Church, with headquarters at St. Paul.

Chicago, Rock Island & Pacific.—M. E. Sebree, Division Superintendent at Dalhart, Tex., has resigned. C. M. Jones succeeds Mr. Sebree.

G. W. Rourke, hitherto Superintendent of the Fort Worth & Denver City, has been appointed Superintendent of Terminals at Kansas City.

J. M. Brown, Division Engineer at Cedar Rapids, Iowa, has been appointed Engineer of the Central district, with office at Davenport, Iowa. G. Davis, Principal Assistant Engineer, with office at Cedar Rapids, has been appointed Engineer of the Northern district, remaining at his former headquarters.

Columbia Southern.—W. W. Cotton has been appointed General Attorney; M. J. Buckley, General Superintendent; J. F. Graham, Superintendent of Motive Power; G. W. Boschke, Chief Engineer; R. Koehler, General Purchasing Agent; R. B. Miller, General Freight Agent, and A. L. Craig, General Passenger Agent of this new road.

Evansville & Terre Haute.—J. O. Crockett, formerly General Superintendent of the Southwestern district of the Chicago, Rock Island & Pacific, has been appointed Superintendent of the Evansville & Terre Haute, the Evansville & Indianapolis and the Evansville Belt, succeeding J. S. Douglas, resigned. The position of Chief Engineer has been abolished and maintenance of way matters will be handled by the Superintendent.

Guthrie, Fairview & Western.—George Cowies has been appointed Chief Engineer, and William C. McKee, Superintendent of Bridges and Buildings of this new road.

Mexican Central.—E. R. Walter has been appointed Superintendent of the Coahuila & Pacific division. Mr. Walter was General Superintendent of the Coahuila & Pacific before its acquisition by the Mexican Central.

Mexican National Construction.—The former Board of Directors and officers have resigned, and the following elections have been made: A. A. Robinson, President; H. R. Nickerson, Vice-President; C. A. Browne, Treasurer and Transfer Agent; James Piper, Secretary; and Frank M. Souther, Registrar.

Midland Valley.—J. F. Elder, General Manager, has been appointed Traffic Manager, and the position of General Manager has been abolished. John H. Harris has been appointed General Superintendent in charge of operation and maintenance.

Missouri Pacific.—H. K. Mudd, General Foreman of the Wabash at St. Louis, Mo., has been appointed District Master Mechanic, with headquarters at Little Rock, Ark.

J. H. Abrams, Superintendent of Terminals at Little Rock, Ark., has resigned.

Oregon Short Line.—The jurisdiction of T. M. Schumacher, Traffic Manager, has been extended over the lines of the Southern Pacific east of and including Sparks, Nev., and the lines of the Nevada & California.

Panhandle & Gulf.—Nicholas J. O'Brien has been appointed General Manager with headquarters at Sweetwater, Tex. This road is part of the Kansas City, Mexico & Orient and has just been opened.

Paris & Great Northern.—E. W. Dickson has been appointed General Superintendent, succeeding C. Griffith, transferred.

St. Louis Southwestern of Texas.—J. W. Flanagan, General Passenger Agent, has resigned. J. H. Lehan, General Freight Agent, will resume his former title of General Freight & Passenger Agent.

Savannah & Statesboro.—See Seaboard Air Line, below.

Seaboard Air Line.—H. B. Grimshaw, hitherto Superintendent of the Savannah & Statesboro, has been appointed Superintendent of the Fifth division, succeeding Walter Hale, transferred.

Southern Pacific.—T. H. Goodman, General Passenger Agent, has resigned, effective September 30, having been in poor health for some time.

LOCOMOTIVE BUILDING.

The Southern, it is reported, has placed orders for 90 additional locomotives.

The Chicago, Milwaukee & St. Paul is building 10 freight locomotives at its Milwaukee shops.

The Central New England has ordered 15 locomotives from the American Locomotive Company.

The Philadelphia & Reading, it is reported, will soon build ten freight locomotives at its own shops.

The Duluth & Iron Range, and the *Duluth, Missabe & Northern* are reported in the market for locomotives.

The Spokane & Inland is reported to have ordered six electric locomotives from the Westinghouse Electric Company.

The Canadian Pacific denies that it will shortly be in the market for locomotives, as reported in our issue of September 15. It expects to order a number of locomotives for 1906 delivery, but as yet serious consideration has not been given to the matter.

The Isthmian Canal Commission, as reported in our issue of Sept. 1, opened bids Sept. 19 on 120 mogul locomotives. One hundred of these are for June, 1906, delivery. These weigh 128,000 lbs., with 100,000 lbs. on drivers; cylinders, 19 in. x 24 in.; diameter of drivers, 54 in.; extended wagon top boiler; working steam pressure, 180 lbs.; tubes, 2 in. in diameter and 11 ft. long; firebox, 98 in. x 34 in.; tank capacity, 4,000 gallons; coal capacity, six tons. The remaining 20 engines are for March, 1906, delivery, and these each weigh about 140,000 lbs., with 120,000 lbs. on drivers; cylinders, 20 in. x 26 in.; diameter of drivers, 63 in.; extended wagon top boilers; working steam pressure, 180 lbs.; tubes, 2 in. in diameter by 12 ft. 3 in. long; firebox, 108 in. by 40 in.; tank capacity, 4,000 gallons; coal capacity, six tons.

The Union Pacific and the Southern Pacific, as reported in our issue of August 25, have ordered 72 simple consolidation (2-8-0) locomotives, 23 simple Atlantic (4-4-2) locomotives, 10 simple Pacific (4-6-2) locomotives, and 35 simple switching (0-6-0) locomotives from the Baldwin Locomotive Works, delivery beginning in November. The consolidation locomotives will weigh 208,000 lbs., with 187,000 lbs. on the drivers; cylinders, 22 in. x 30 in.; diameter of drivers, 57 in.; straight boiler, with a working steam pressure of 200 lbs.; heating surface, 3,403 sq. ft.; 413 tubes, 2 in. in diameter and 15 ft. long; firebox, 108 in. x 66 in.; grate area, 49.5 sq. ft.; tank capacity, 7,000 gallons; coal capacity, 14 tons, and oil capacity, 2,940 gallons. The Atlantic type locomotives will weigh 196,000 lbs., with 105,000 lbs. on the drivers; cylinders, 20 in. x 28 in.; diameter of drivers, 81 in.; straight boiler, with a working steam pressure of 200 lbs.; heating surface, 2,649 sq. ft.; 297 tubes, 2 in. in diameter and 16 ft. long; firebox, 108 in. x 66 in.; grate area, 49.5 sq. ft.; tank capacity, 9,000 gallons; coal capacity, 10 tons, and oil capacity, 2,835 gallons. The Pacific type locomotives will weigh 222,000 lbs., with 141,000 lbs. on the drivers; cylinders, 22 in. x 28 in.; diameter of drivers, 77 in.; straight boiler, with a working steam pressure of 200 lbs.; heating surface, 3,048 sq. ft.; 245 tubes, 2½ in. in diameter and 20 ft. long; firebox, 108 in. x 66 in.; grate area, 49.5 sq. ft.; tank capacity, 9,000 gallons; coal capacity, 10 tons, and oil capacity, 2,835 gallons. The switching locomotives will weigh 140,000 lbs.; cylinders, 19 in. x 26 in.; diameter of drivers, 51 in.; straight boiler, with a working steam pressure of 175 lbs.; heating surface, 1,557 sq. ft.; 237 tubes, 2 in. in diameter and 11 ft. 6 in. long; firebox, 108 in. x 40¼ in.; grate area, 30.2 sq. ft.; tank capacity, 4,000 gallons; coal capacity, six tons, and oil capacity, 1,020 gallons. The special equipment for all will include: Gollmar bell ringers, Damascus brake-beams, Sargent Diamond "S" brake-shoes, Climax couplers, Handlan-Buck headlights, Monitor injectors, U. S. piston and valve rod packings, Crosby safety valves, Maryland sanding devices, Nathan sight-feed lubricators, Railway Steel Spring Co.'s springs, Ashcroft steam gages, Consolidated steam heat equipment for Atlantic and Pacific type locomotives, Standard driving, truck and tender wheel tires and cast-steel wheel centers.

CAR BUILDING.

The Seaboard Air Line is reported in the market for 15 passenger cars.

The Mexican International, it is reported, will build 175 cars at its own shops.

The Chicago Electric Traction Company is in the market for ten double truck cars.

The Evansville & Mt. Vernon Traction Company, it is reported, is in the market for cars.

O'Garra, King & Company, Chicago, are considering the purchase of 500 or more coal cars.

The Chicago, Burlington & Quincy has ordered two dining cars from the Pullman Company.

The South Side Elevated, Chicago, has ordered 30 cars from the American Car & Foundry Company.

The Toledo, Ann Arbor & Detroit has ordered 10 cars from the Niles Car & Manufacturing Company.

The Erie has ordered 1,000 steel hopper cars of 100,000 lbs. capacity from the Pressed Steel Car Co.

The Duluth & Iron Range and the *Duluth, Missabe & Northern* are in the market for 1,500 freight cars.

The Central of Georgia has ordered 50 ballast cars from the Rodger Ballast Car Co. for October delivery.

The Kansas City Southern has ordered 100 stock cars of 60,000 lbs. capacity from the American Car & Foundry Co.

The Philadelphia & Reading, it is reported, has ordered 1,000 cars of 100,000 lbs. capacity from the Standard Steel Car Co.

The New York, New Haven & Hartford is having two all-steel mail and express cars built by the Standard Steel Car Co.

The Chicago & Alton is in the market for four baggage, three passenger and baggage, and three passenger and mail cars.

The Chicago, Lake Shore & Eastern is in the market for 1,000 gondola and box cars of 100,000 lbs. capacity with steel underframes.

The Salem, Falls City & Western has purchased three 41-ft. second-hand flat cars of 60,000 lbs. capacity from the Interstate Car Co., of Indianapolis, Ind.

The Central of New Jersey, as reported in our issue of September 1, has ordered 50 all-steel ore cars of 80,000 lbs. capacity from the Pressed Steel Car Co.

The Erie, as reported in our issue of August 25, is reported to have ordered 500 box cars from Barney & Smith, and 1,500 box cars from the Standard Steel Car Co.

The Southern has ordered three steel passenger cars from the Pressed Steel Car Company, and is reported as being in the market for 10 mail baggage and express cars.

The Kansas City Southern, as reported in our issue of Sept. 8, has ordered five chair cars and two combination passenger and mail cars from the American Car & Foundry Company.

The Chicago, Burlington & Quincy is asking bids on 2,000 box cars of 80,000 lbs. capacity. These box cars will be 40 ft. long, 8 ft. 6 in. wide and 8 ft. high, all inside measurements.

The Philadelphia Rapid Transit Company has ordered 40 steel passenger cars from the Pressed Steel Car Co. The cars will be built at the company's new passenger car department at Pittsburg.

The Southern Pacific, as reported in our issue of September 15, has ordered 15 passenger cars from the Pullman Co. The order consists of four baggage cars, four observation cars and seven dining cars.

The Peet Brothers Manufacturing Company, Kansas City, has ordered eight steel tank cars of 80,000 lbs. capacity, and three steel tank cars of 100,000 lbs. capacity from the Bettendorf Axle Company.

The Grand Trunk has ordered 17 standard first class coaches and eight standard smoking cars from the Canada Car Company, and is building three standard café parlor cars and four standard baggage cars at its Montreal shops.

The Southern, as reported in our issue of Sept. 1, has ordered 750 flat and 750 gondola cars of 100,000 lbs. capacity from the American Car & Foundry Company, and 300 Hart convertible cars and six distributing cars from the Rodger Ballast Car Company.

The Granite City, Alton & Eastern has ordered 25 all-steel tank cars of 7,500 gallons capacity from the Bettendorf Axle Co. for January, 1906, delivery. The inside dimensions of the tanks are 27 ft. long x 84 in. in diameter. The cars will have steel underframes and the special equipment includes: Bettendorf axles and bolsters, Monarch brake-beams, Walsh's brake-shoes, Westinghouse brakes, Ajax plastic bronze brasses, Tower couplers, Cardwell draft rigging, Harrison dust guards, Bettendorf boxes, Union Spring & Manufacturing Co.'s springs and Bettendorf trucks. It was previously reported in our issue of September 1 that the St. Louis Syrup & Preserving Co., Granite City, Ill., were in the market for the above cars.

The Duluth, South Shore & Atlantic has ordered 200 box cars of 60,000 lbs. capacity, as reported in our issue of Sept. 15, and 100 flat cars of 60,000 lbs. capacity from the American Car & Foundry Co., for November delivery. The box cars will be 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, all inside measurements. The flat cars will be 40 ft. long and 8 ft. 9 in. wide, over all. The

special equipment for both will include: Common Sense bolsters, Chicago Railway Equipment Co.'s brake-beams, Congdon brake-shoes, Westinghouse automatic air-brakes, Fulton Brass Manufacturing Co.'s brasses, Trojan couplers, Gould draft rigging, Harrison dust guards, Symington journal boxes, Chicago metal roofs, Railway Steel Spring Co.'s springs, Diamond trucks, and American Car & Foundry Co.'s wheels.

The Central of Georgia, as reported in our issue of September 15, has ordered 500 steel hopper coal cars of 100,000 lbs. capacity from the Pressed Steel Car Co., for February, 1906, delivery; 450 ventilated box cars of 60,000 lbs. capacity from the South Atlantic Car & Manufacturing Co., for delivery within 90 days, and 400 flat cars of 60,000 lbs. capacity from the Pullman Co., for January, 1906, delivery. The coal cars will be 30 ft. long and 9 ft. 6 in. wide, inside measurements. The box cars will weigh about 35,000 lbs., and measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements. The flat cars will be 40 ft. long and 9 ft. wide, over all. The special equipment for all will include: Simplex bolsters and brake-beams, Lappin or Herron brake-shoes, Westinghouse air-brakes, Ajax brasses, Tower couplers, Dunham door fastenings for coal cars and Jones door fastenings for box cars, Miner tandem draft rigging for coal and flat cars, Butler tandem draft rigging and Symington dust guards for box cars, McCord journal boxes for coal and flat cars, Symington journal boxes for box cars, Sherwin-Williams or Lowe Bros.' paint for box and flat cars, Murphy improved Winslow roofs for box cars, Railway Steel Spring Co.'s springs, arch-bar trucks and M. C. B. cast-iron wheels.

BRIDGE BUILDING.

AURORA, ILL.—Plans are being made by M. J. Tarbell, Engineer, for two concrete steel bridges to cost about \$50,000.

BEAUFORT, N. C.—A contract has been given to the General Construction & Engineering Co., of New York, for building the substructure and the superstructure of a trestle bridge with two steel draws 8,500 ft. long for the Atlantic & North Carolina Railroad at a cost of \$200,000 over the Newport river connecting Beaufort with Morehead City, N. C.

BLOOMFIELD, IND.—The Indianapolis Southern on its new Indianapolis line near this place will build a viaduct 2,800 ft. long and (at the highest point) 175 ft. high.

CHATTANOOGA, TENN.—Plans are being made for a bridge to be built over the Belt Line tracks at Eleventh street, for which an appropriation of \$12,000 has been made.

CINCINNATI, OHIO.—Three ordinances have been passed by the City Council looking to the abolition of all grade crossings within the city limits by the building of viaducts or subways. On the Cincinnati, Hamilton & Dayton there are 35; on the Baltimore & Ohio 18, and on the Big Four 11.

FINDLAY, OHIO.—Hancock County Commissioners have under consideration the question of building a steel bridge at Mt. Blanchard to cost about \$10,000. J. O. Sutton is County Engineer.

LONDON, ONT.—The Southwestern Traction Co. will build a steel bridge east of Richmond street at a cost of about \$18,000.

MANITOWOC, WIS.—The present bridge over the river at Tenth street will be repaired at a cost of \$15,000 or a new structure will be built at a cost of \$60,000.

OTTAWA, ONT.—The Dominion Minister of Public Works has directed the Chief Engineer of the department to report on the cost of building a tunnel under Northumberland straits to connect Prince Edward Island and New Brunswick.

PIERRE, S. DAK.—Work will soon be commenced, it is said, on a new bridge over the Missouri River at this place by the Chicago & North-Western.

PURCELL, IND. T.—Plans have been made and funds have been subscribed to build a bridge between this place and Lexington, at a cost of \$30,000. J. W. Hooker, is interested.

RACINE, WIS.—The City Council is having plans made for building a bridge over Root river 240 ft. long, with a double draw at the foot of Main street.

REBELUFF, CAL.—The Board of Supervisors has under consideration the question of building a bridge over the Sacramento river at Tehama to cost about \$50,000.

RENSSELAER, IND.—The Board of Commissioners of Jasper County will receive bids October 2 for building a steel bridge 40 ft. long with a 16-ft. roadway in Jordan township. James M. Leatherman is County Auditor.

RICHMOND, IND.—The Pennsylvania has agreed to pay 60 per cent. of the cost of building a viaduct in West Richmond so that a new city street may pass beneath its tracks. The city is to pay the remainder.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

CANADIAN PACIFIC.—This company has given several additional contracts for double tracking its road between Winnipeg and Fort William. Foley Brothers & Larsen have the contract to pierce a 400-ft. tunnel through solid rock; Fred Peterson & Co. have been given a contract for building the line from Ostersund to Busteed, and Hoagland & Sharpe have the contract to change the line at Eagle River for a distance of four miles.

CHICAGO & ALTON.—Announcement has been made that this company has bought the Peoria & Pekin Terminal Railway, which operates 10 miles of railroad from Peoria, Ill., south to Pekin, and 1.5 miles from the latter place to Crescent; also leases the Peoria Terminal Railroad from Iowa Junction to Eaton street, Peoria, nine miles; has trackage rights over the Central Railroad of Peoria from the city limits to the center of the city of Peoria, five miles, giving a total of 25.5 miles, of which nine miles are double track. The road uses steam locomotives for freight and through passenger service, the Chicago & Alton and other roads entering Peoria over its tracks, and also has considerable electrical equipment which is used for local passenger traffic. This purchase gives the Alton valuable terminals at Peoria. The Alton will, it is said, build a line from Washington, Ill., southwest to Grove, where connection will be made with its southern line, a distance of about 15 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Bids are wanted September 28 for grade reduction work on the St. Louis division of this road from Carbon, Ill., east to Coal Bluff, a distance of about five miles. The work includes the excavation of 500,000 cu. yds. of earth. W. M. Duane is Superintendent of Construction, Cincinnati, Ohio.

CORDOVA & HUATUSCO.—Grading work on this road has been in progress for some time. It is a narrow-gage line that extends north from Cordova, State of Vera Cruz, through the coffee-growing district of the State. It will be about 75 miles long. One of the bridges which is being built over an arroyo on this road will be 213 ft. above high-water mark. This bridge will be 408 ft. long.

DENVER, KANSAS & GULF RAILWAY.—An officer writes that this road, which was recently incorporated in Kansas, will build about 300 miles of main line with branches in that state, connecting with the Denver, Enid & Gulf. (August 25, p. 62.)

DENVER, NORTHWESTERN & PACIFIC.—This company has recently opened its extension to Hot Sulphur Springs, in Grand County, Colo. (See Construction Record.)

DULUTH, SOUTH SHORE & ATLANTIC.—This company is planning to extend its Mineral Range line northeast to Keweenaw Point, a distance of about 30 miles.

GALVESTON, HARRISBURG & SAN ANTONIO (S. P.).—An officer writes confirming the report that a contract has been let to W. O. Robertson, of San Antonio, Tex., for building the proposed extension from Stockdale, in Wilson County, Tex., southeast through Smiley, in Gonzales County, to Cuero, in De Witt County, a distance of 47 miles. Grading has been commenced. The maximum grades will be 1 per cent., and maximum curves 4 degrees; there will be two steel bridges, one of 150 ft. and the other of 190 ft. (See Southern Pacific, September 15, p. 88.)

GALVESTON TERMINAL COMPANY.—Under this name a company has been organized in Texas to build a terminal railroad for the St. Louis & San Francisco in Galveston, from the eastern shore of Galveston Bay over the island to the western limits of the city. The incorporators include: S. Lazarus, of St. Louis, Mo.; M. Marx, B. Adone, I. H. Kempner, Abe Blum, E. R. Chessbrough, R. Markwell, John Sealy, Charles Fowler and Leon Blum, all of Galveston.

GULF, SANTA FE & NORTHWESTERN.—This company has been organized in Texas with a capital of \$475,000, as a part of the Santa Fe system, to build a railroad from Brownwood to Texico, a distance of 350 miles, and a branch from Lubbock County to Canyon, Tex., 125 miles. The board of directors include: E. P. Ripley, of Chicago, President of the Atchison, Topeka & Santa Fe; J. E. Hurley, of Topeka, Kan., General Manager of the same road; and Avery Turner, D. A. Sweet, J. C. Paul and others, of Amarillo, Tex.

JOHNSON CITY SOUTHERN (SOUTHERN).—A contract has been given by this company to W. J. Oliver, of Knoxville, Tenn., to build its road. The proposed route is from Marion, N. C., to Johnson City, a distance of about 80 miles. The work will be heavy, as the road passes through the Blue Ridge Mountains. It will reach valuable coal fields in Virginia. (June 30, p. 215.)

JONESBORO, LAKE CITY & EASTERN.—This company, operating 55 miles of road in Arkansas, has filed an amendment to its charter increasing its capital from \$225,000 to \$525,000. The increase is made for the purpose of building a branch line from Dell, Mississ-

ippi County, Ark., south through Luxora and Osceola, a distance of 20 miles, at an estimated cost of \$300,000.

MIDLAND VALLEY.—Train service has been opened on this road from Skiatook, Ind. T., northwest to Pawhuska, 34 miles, completing the line from Fort Smith, Ark., to Pawhuska. The road will eventually be continued northwest to Arkansas City, Kan., 62 miles from Pawhuska.

MISSOURI PACIFIC.—See St. Louis, Iron Mountain & Southern below.

MOBILE, JACKSON & KANSAS CITY.—On September 5, this road was opened from Newton, Miss., north to Middletown, Tenn., completing a through line from Mobile to Middletown, a distance of 364 miles. The construction work was completed at the Pearl river bridge, in Neshoba County, a structure 1,237 ft. long with approaches from the north by two trestles of 947 and 960 ft. each. The road will eventually be extended north to Jackson, Tenn., 41 miles beyond Middletown.

NEW YORK, NEW HAVEN & HARTFORD.—Plans are being made by this company for a tunnel 4,700 ft. long at Pequabuck in Litchfield County, Connecticut, on the Highland division which will cost approximately \$1,000,000.

OKLAHOMA & TEXAS.—Arrangements have been made by this company to secure money, and contracts for building the road, it is said, will be let by the first of next month. The proposed route is from Oklahoma City, Okla. T., to Wichita Falls, Tex., a distance of approximately 200 miles. (April 7, p. 110.)

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The Chicago, Burlington & Quincy has ordered two dining cars from the Pullman Company.*

The South Side Elevated, Chicago, has ordered 30 cars from the American Car & Foundry Company.

The Toledo, Ann Arbor & Detroit has ordered 10 cars from the Niles Car & Manufacturing Company.

The Erie has ordered 1,000 steel hopper cars of 100,000 lbs. capacity from the Pressed Steel Car Co.

The Duluth & Iron Range and the *Duluth, Missabe & Northern* are in the market for 1,500 freight cars.

The Central of Georgia has ordered 50 ballast cars from the Rodger Ballast Car Co. for October delivery.

The Kansas City Southern has ordered 100 stock cars of 60,000 lbs. capacity from the American Car & Foundry Co.

The Philadelphia & Reading, it is reported, has ordered 1,000 cars of 100,000 lbs. capacity from the Standard Steel Car Co.

The New York, New Haven & Hartford is having two all-steel mail and express cars built by the Standard Steel Car Co.

The Chicago & Alton is in the market for four baggage, three passenger and baggage, and three passenger and mail cars.

The Chicago, Lake Shore & Eastern is in the market for 1,000 gondola and box cars of 100,000 lbs. capacity with steel underframes.

The Salem, Falls City & Western has purchased three 41-ft. second-hand flat cars of 60,000 lbs. capacity from the Interstate Car Co., of Indianapolis, Ind.

The Central of New Jersey, as reported in our issue of September 1, has ordered 50 all-steel ore cars of 80,000 lbs. capacity from the Pressed Steel Car Co.

The Erie, as reported in our issue of August 25, is reported to have ordered 500 box cars from Barney & Smith, and 1,500 box cars from the Standard Steel Car Co.

The Southern has ordered three steel passenger cars from the Pressed Steel Car Company, and is reported as being in the market for 10 mail baggage and express cars.

The Kansas City Southern, as reported in our issue of Sept. 8, has ordered five chair cars and two combination passenger and mail cars from the American Car & Foundry Company.

The Chicago, Burlington & Quincy is asking bids on 2,000 box cars of 80,000 lbs. capacity. These box cars will be 40 ft. long, 8 ft. 6 in. wide and 8 ft. high, all inside measurements.

The Philadelphia Rapid Transit Company has ordered 40 steel passenger cars from the Pressed Steel Car Co. The cars will be built at the company's new passenger car department at Pittsburg.

The Southern Pacific, as reported in our issue of September 15, has ordered 15 passenger cars from the Pullman Co. The order consists of four baggage cars, four observation cars and seven dining cars.

The Peet Brothers Manufacturing Company, Kansas City, has ordered eight steel tank cars of 80,000 lbs. capacity, and three steel tank cars of 100,000 lbs. capacity from the Bettendorf Axle Company.

The Grand Trunk has ordered 17 standard first class coaches and eight standard smoking cars from the Canada Car Company, and is building three standard café parlor cars and four standard baggage cars at its Montreal shops.

The Southern, as reported in our issue of Sept. 1, has ordered 750 flat and 750 gondola cars of 100,000 lbs. capacity from the American Car & Foundry Company, and 300 Hart convertible cars and six distributing cars from the Rodger Ballast Car Company.

The Granite City, Alton & Eastern has ordered 25 all-steel tank cars of 7,500 gallons capacity from the Bettendorf Axle Co. for January, 1906, delivery. The inside dimensions of the tanks are 27 ft. long x 84 in. in diameter. The cars will have steel underframes and the special equipment includes: Bettendorf axles and bolsters, Monarch brake-beams, Walsh's brake-shoes, Westinghouse brakes, Ajax plastic bronze brasses, Tower couplers, Cardwell draft rigging, Harrison dust guards, Bettendorf boxes, Union Spring & Manufacturing Co.'s springs and Bettendorf trucks. It was previously reported in our issue of September 1 that the St. Louis Syrup & Preserving Co., Granite City, Ill., were in the market for the above cars.

The Duluth, South Shore & Atlantic has ordered 200 box cars of 60,000 lbs. capacity, as reported in our issue of Sept. 15, and 100 flat cars of 60,000 lbs. capacity from the American Car & Foundry Co., for November delivery. The box cars will be 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, all inside measurements. The flat cars will be 40 ft. long and 8 ft. 9 in. wide, over all. The

special equipment for both will include: Common Sense bolsters, Chicago Railway Equipment Co.'s brake-beams, Congdon brake-shoes, Westinghouse automatic air-brakes, Fulton Brass Manufacturing Co.'s brasses, Trojan couplers, Gould draft rigging, Harrison dust guards, Symington journal boxes, Chicago metal roofs, Railway Steel Spring Co.'s springs, Diamond trucks, and American Car & Foundry Co.'s wheels.

The Central of Georgia, as reported in our issue of September 15, has ordered 500 steel hopper coal cars of 100,000 lbs. capacity from the Pressed Steel Car Co., for February, 1906, delivery; 450 ventilated box cars of 60,000 lbs. capacity from the South Atlantic Car & Manufacturing Co., for delivery within 90 days, and 400 flat cars of 60,000 lbs. capacity from the Pullman Co., for January, 1906, delivery. The coal cars will be 30 ft. long and 9 ft. 6 in. wide, inside measurements. The box cars will weigh about 35,000 lbs., and measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements. The flat cars will be 40 ft. long and 9 ft. wide, over all. The special equipment for all will include: Simplex bolsters and brake-beams, Lappin or Herron brake-shoes, Westinghouse air-brakes, Ajax brasses, Tower couplers, Dunham door fastenings for coal cars and Jones door fastenings for box cars, Miner tandem draft rigging for coal and flat cars, Butler tandem draft rigging and Symington dust guards for box cars, McCord journal boxes for coal and flat cars, Symington journal boxes for box cars, Sherwin-Williams or Lowe Bros.' paint for box and flat cars, Murphy improved Winslow roofs for box cars, Railway Steel Spring Co.'s springs, arch-bar trucks and M. C. B. cast-iron wheels.

BRIDGE BUILDING.

AURORA, ILL.—Plans are being made by M. J. Tarbell, Engineer, for two concrete steel bridges to cost about \$50,000.

BEAUFORT, N. C.—A contract has been given to the General Construction & Engineering Co., of New York, for building the substructure and the superstructure of a trestle bridge with two steel draws 8,500 ft. long for the Atlantic & North Carolina Railroad at a cost of \$200,000 over the Newport river connecting Beaufort with Morehead City, N. C.

BLOOMFIELD, IND.—The Indianapolis Southern on its new Indianapolis line near this place will build a viaduct 2,800 ft. long and (at the highest point) 175 ft. high.

CHATTANOOGA, TENN.—Plans are being made for a bridge to be built over the Belt Line tracks at Eleventh street, for which an appropriation of \$12,000 has been made.

CINCINNATI, OHIO.—Three ordinances have been passed by the City Council looking to the abolition of all grade crossings within the city limits by the building of viaducts or subways. On the Cincinnati, Hamilton & Dayton there are 35; on the Baltimore & Ohio 18, and on the Big Four 11.

FINDLAY, OHIO.—Hancock County Commissioners have under consideration the question of building a steel bridge at Mt. Blanchard to cost about \$10,000. J. O. Sutton is County Engineer.

LONDON, ONT.—The Southwestern Traction Co. will build a steel bridge east of Richmond street at a cost of about \$18,000.

MANITOWOC, WIS.—The present bridge over the river at Tenth street will be repaired at a cost of \$15,000 or a new structure will be built at a cost of \$60,000.

OTTAWA, ONT.—The Dominion Minister of Public Works has directed the Chief Engineer of the department to report on the cost of building a tunnel under Northumberland straits to connect Prince Edward Island and New Brunswick.

PIERRE, S. DAK.—Work will soon be commenced, it is said, on a new bridge over the Missouri River at this place by the Chicago & North-Western.

PURCELL, IND. T.—Plans have been made and funds have been subscribed to build a bridge between this place and Lexington, at a cost of \$30,000. J. W. Hooker, is interested.

RACINE, WIS.—The City Council is having plans made for building a bridge over Root river 240 ft. long, with a double draw at the foot of Main street.

REDBLUFF, CAL.—The Board of Supervisors has under consideration the question of building a bridge over the Sacramento river at Tehama to cost about \$50,000.

RENSSELAER, IND.—The Board of Commissioners of Jasper County will receive bids October 2 for building a steel bridge 40 ft. long with a 16-ft. roadway in Jordan township. James M. Leatherman is County Auditor.

RICHMOND, IND.—The Pennsylvania has agreed to pay 60 per cent. of the cost of building a viaduct in West Richmond so that a new city street may pass beneath its tracks. The city is to pay the remainder.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

CANADIAN PACIFIC.—This company has given several additional contracts for double tracking its road between Winnipeg and Fort William. Foley Brothers & Larsen have the contract to pierce a 400-ft. tunnel through solid rock; Fred Peterson & Co. have been given a contract for building the line from Ostersund to Busteed, and Hoagland & Sharpe have the contract to change the line at Eagle River for a distance of four miles.

CHICAGO & ALTON.—Announcement has been made that this company has bought the Peoria & Pekin Terminal Railway, which operates 10 miles of railroad from Peoria, Ill., south to Pekin, and 1.5 miles from the latter place to Crescent; also leases the Peoria Terminal Railroad from Iowa Junction to Eaton street, Peoria, nine miles; has trackage rights over the Central Railroad of Peoria from the city limits to the center of the city of Peoria, five miles, giving a total of 25.5 miles, of which nine miles are double track. The road uses steam locomotives for freight and through passenger service, the Chicago & Alton and other roads entering Peoria over its tracks, and also has considerable electrical equipment which is used for local passenger traffic. This purchase gives the Alton valuable terminals at Peoria. The Alton will, it is said, build a line from Washington, Ill., southwest to Grove, where connection will be made with its southern line, a distance of about 15 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Bids are wanted September 28 for grade reduction work on the St. Louis division of this road from Carbon, Ill., east to Coal Bluff, a distance of about five miles. The work includes the excavation of 500,000 cu. yds. of earth. W. M. Duane is Superintendent of Construction, Cincinnati, Ohio.

CORDOVA & HUATUSCO.—Grading work on this road has been in progress for some time. It is a narrow-gage line that extends north from Cordova, State of Vera Cruz, through the coffee-growing district of the State. It will be about 75 miles long. One of the bridges which is being built over an arroyo on this road will be 213 ft. above high-water mark. This bridge will be 408 ft. long.

DENVER, KANSAS & GULF RAILWAY.—An officer writes that this road, which was recently incorporated in Kansas, will build about 300 miles of main line with branches in that state, connecting with the Denver, Enid & Gulf. (August 25, p. 62.)

DENVER, NORTHWESTERN & PACIFIC.—This company has recently opened its extension to Hot Sulphur Springs, in Grand County, Colo. (See Construction Record.)

DULUTH, SOUTH SHORE & ATLANTIC.—This company is planning to extend its Mineral Range line northeast to Keweenaw Point, a distance of about 30 miles.

GALVESTON, HARRISBURG & SAN ANTONIO (S. P.).—An officer writes confirming the report that a contract has been let to W. O. Robertson, of San Antonio, Tex., for building the proposed extension from Stockdale, in Wilson County, Tex., southeast through Smiley, in Gonzales County, to Cuero, in De Witt County, a distance of 47 miles. Grading has been commenced. The maximum grades will be 1 per cent., and maximum curves 4 degrees; there will be two steel bridges, one of 150 ft. and the other of 190 ft. (See Southern Pacific, September 15, p. 88.)

GALVESTON TERMINAL COMPANY.—Under this name a company has been organized in Texas to build a terminal railroad for the St. Louis & San Francisco in Galveston, from the eastern shore of Galveston Bay over the island to the western limits of the city. The incorporators include: S. Lazarus, of St. Louis, Mo.; M. Marx, B. Adone, I. H. Kempner, Abe Blum, E. R. Chessbrough, R. Markwell, John Sealy, Charles Fowler and Leon Blum, all of Galveston.

GULF, SANTA FE & NORTHWESTERN.—This company has been organized in Texas with a capital of \$475,000, as a part of the Santa Fe system, to build a railroad from Brownwood to Texico, a distance of 350 miles, and a branch from Lubbock County to Canyon, Tex., 125 miles. The board of directors include: E. P. Ripley, of Chicago, President of the Atchison, Topeka & Santa Fe; J. E. Hurley, of Topeka, Kan., General Manager of the same road; and Avery Turner, D. A. Sweet, J. C. Paul and others, of Amarillo, Tex.

JOHNSON CITY SOUTHERN (SOUTHERN).—A contract has been given by this company to W. J. Oliver, of Knoxville, Tenn., to build its road. The proposed route is from Marion, N. C., to Johnson City, a distance of about 80 miles. The work will be heavy, as the road passes through the Blue Ridge Mountains. It will reach valuable coal fields in Virginia. (June 30, p. 215.)

JONESBORO, LAKE CITY & EASTERN.—This company, operating 55 miles of road in Arkansas, has filed an amendment to its charter increasing its capital from \$225,000 to \$525,000. The increase is made for the purpose of building a branch line from Dell, Mississ-

ippi County, Ark., south through Luxora and Osceola, a distance of 20 miles, at an estimated cost of \$300,000.

MIDLAND VALLEY.—Train service has been opened on this road from Skiatook, Ind. T., northwest to Pawhuska, 34 miles, completing the line from Fort Smith, Ark., to Pawhuska. The road will eventually be continued northwest to Arkansas City, Kan., 62 miles from Pawhuska.

MISSOURI PACIFIC.—See St. Louis, Iron Mountain & Southern below.

MOBILE, JACKSON & KANSAS CITY.—On September 5, this road was opened from Newton, Miss., north to Middletown, Tenn., completing a through line from Mobile to Middletown, a distance of 364 miles. The construction work was completed at the Pearl river bridge, in Neshoba County, a structure 1,237 ft. long with approaches from the north by two trestles of 947 and 960 ft. each. The road will eventually be extended north to Jackson, Tenn., 41 miles beyond Middletown.

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pected to have the road in operation to Moreno Valley next year. Henry Koehler, Jr., of St. Louis, Mo., is president. (July 21, p. 23.)

SAN SABA & COLORADO VALLEY.—An officer writes that surveys are being made by this company for building its proposed railroad from Lometa, Tex., on the Gulf, Colorado & Santa Fe, west to San Saba, a distance of 22 miles. There will be one steel bridge over the Colorado river about 150 ft. long. The company will use steam locomotives for freight trains and gasoline motor cars for passengers. Orton G. Campbell, of Dallas, Tex., is interested.

SOUTH & WESTERN.—The Supreme Court of Virginia has just handed down a decision sustaining the charter of this company, and it is said that the company will now begin building its proposed line through Guest River Valley from Clinchport, Va., to Toms Creek, 15 miles, penetrating rich coal fields. (April 7, p. 111.)

Active work has been started in the digging of the tunnel through Clinch Mountain near Speer's Ferry, Va., by this company. The contractors, Messrs. Walton of Knoxville, have bound themselves to complete the work within 18 months.

SOUTHERN.—See Johnson City Southern above.

This company is making surveys to locate a line around Lynchburg, Va. The new line will be used by freight trains to avoid entering the city over the heavy grades. Two routes are being surveyed, one above and one below the city, and it is said that construction work will be begun soon.

SOUTHERN PACIFIC.—See Galveston, Harrisburg & San Antonio above.

WICHITA VALLEY.—A contract, it is said, has been given by this company to build about 60 miles of its proposed extension from Seymour in Baylor County, Texas.

RAILROAD CORPORATION NEWS.

BALTIMORE & OHIO.—The New York Stock Exchange has listed \$2,000,000 additional Pittsburg, Lake Erie & West Virginia system refunding mortgage 4 per cent. bonds of 1941, making the total amount listed to date, \$31,347,000. Of these \$2,000,000 bonds, \$1,623,000 were issued to retire underlying bonds and the remaining the total amount listed, \$37,350,000.

CENTRAL OF NEW ENGLAND.—The annual report for the year ending June 30, shows a deficit of \$86,491, an increase of \$67,268, as compared with the previous year. The gross earnings were \$973,422, an increase of \$125,671 over last year; but there was a great increase in operating expenses.

CHICAGO & ALTON.—The New York Stock Exchange has been asked to list \$5,362,000 additional 3 per cent. 50-year bonds of 1929, making the total amount listed, \$37,350,000.

CHICAGO TERMINAL TRANSFER.—The annual report for the year ended June 30 shows a deficit of \$169,045, a decrease of \$32,896, as compared with the preceding year. The gross earnings were \$872,524, and other income, \$667,589. Expenses were \$963,859, and taxes and interest, \$745,300, bringing the total expenses up to \$1,709,159. The total capital stock of the company is \$30,000,000, and the funded debt is \$16,239,000.

KANSAS CITY, MEXICO & ORIENT.—This road will receive the second instalment of subsidy from the Mexican Government, amounting to \$1,200,000 Mexican money, as soon as the Mountain division from Minaca southwest toward El Fuerte is completed, which, it is estimated, will be in from 60 to 90 days.

LAKE SHORE ELECTRIC.—The receiver of this road has reported to the court that the entire debt of the company has been paid, and that a large amount more has been earned; therefore, he advises that the receivership should cease.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The annual report for the year ending June 30, shows net earnings of \$2,579,337. The gross earnings were \$10,113,056; operating expenses, \$7,552,650, and other income, \$18,930. Interest, taxes, etc., were \$1,836,612, leaving a net income of \$742,725. The bonded debt is \$16,008,000. Two semi-annual dividends of 2½ per cent. each were declared on the \$10,000,000 capital stock. The total length of the company's lines is 1,226 miles.

NATIONAL OF MEXICO.—This company has arranged to extend its 5 per cent. gold notes of October 1, 1905, for two years at the rate of 5 per cent. per annum, subject to redemption, on any interest date, on 60 days' notice.

NEW YORK, NEW HAVEN & HARTFORD.—This company has formally absorbed the following roads, which it has for several years controlled and operated: The New England, stock, \$25,000,000; New Haven & Derby, stock, \$447,000; bonds, \$575,000; Danbury & Norwalk, stock, \$600,000; bonds, \$650,000; Middletown, Meriden & Waterbury; Rockville Railway Co.; Rhode Island & Massachusetts; Providence & Springfield, stock, \$517,000; and the Providence & Pascoag.

NORTHERN TEXAS TRACTION (ELECTRIC).—A controlling interest in

this road has been sold by the Bishop-Sherwin syndicate, of Cleveland, Ohio, to Stone & Webster, of Boston, at a price said to be \$15 a share. The road has 30 miles of track between Dallas, Tex., and Fort Worth, and 37½ miles in Dallas and Fort Worth. The capital stock is \$2,500,000.

PORTLAND & RUMFORD FALLS.—The gross earnings of this company for the year ending June 30, were \$658,663, an increase of \$75,264. Operating expenses were \$377,953, an increase of \$68,608. The total income was \$345,164, an increase of \$36,005, against which there were fixed charges of \$93,492, leaving a net income of \$251,672, from which, after the deduction of \$141,666 for sinking fund and dividends, there is left a surplus of \$110,006.

TOLEDO & OHIO CENTRAL.—The annual report for the year ended June 30, shows gross earnings of \$3,766,651, an increase of \$167,967 over the preceding year. Expenses and taxes were \$2,927,809, an increase of \$125,588, making net earnings \$838,842, an increase of \$42,379. Charges, less other income, leave a surplus of \$430,373, a decrease of \$927.

TOLEDO, PEORIA & WESTERN.—The annual report for the year ending June 30, shows a deficit of \$32,872. In the preceding year the road showed a surplus of \$1,547. The gross earnings were \$1,281,443, a decrease of \$27,273 over last year, and the operating expenses and taxes, \$1,077,041, an increase of \$1,027, making net earnings of \$204,402, a decrease of \$28,294, against which there were charges of \$273,274, an increase of \$6,125. The cost of road and equipment is given as \$9,427,685; and total assets as \$10,063,085; liabilities, capital stock, \$4,076,900, and funded debt, \$4,895,000. The controlling interest in the capital stock of this company is held jointly by the Pennsylvania and the St. Louis, Keokuk & Northwestern.

WABASH.—President Ramsey's advertisement to stockholders and holders of debenture bonds which is referred to in our editorial columns this week, is as follows: "During my service of 10 years to you, as General Manager, Vice-President and President of your company, the lines of your railroad have been extended to the cities of Omaha and Des Moines on the west and to Buffalo and Pittsburg on the east, over its own and its leased and controlled lines; the tracks have been relaid with heavy rails; many miles of wooden trestles have been filled in with solid embankments or replaced with iron bridges; over 70 miles of double main track have been built; nearly the whole of the old and obsolete motive power and equipment replaced with the best modern types, and more than doubled in power and capacity for handling traffic; and your properties brought to a high standard as operative railroads. Of the cost of this work at least 12 millions of dollars was paid out of net earnings. I think I may fairly claim that all of the improvements and extensions mentioned, have been made by or carried out at my suggestions, or by my initiative. During the period named above, the gross earnings of your properties have increased from eleven millions five hundred and fifty thousand dollars to twenty-five millions of dollars per annum. Under this statement of the results of my administration, I feel that I am entitled to ask you to honor me with your proxies, for use at the annual election of directors, to be held on October 10th next.

"I realize fully the responsibility assumed by me in making this request; and should you honor me with your confidence, I shall use the power you confide in me, in an endeavor to elect such directors, as will fully recognize the obligations assumed by them, as representatives of all the owners of your properties. I question if anyone is better acquainted with the Wabash Railroad, its capabilities and its possibilities, than myself, after my long connection with its management; and I do not hesitate to say, that with prudent, conscientious and impartial operation, there should be at an early date some pecuniary return to its owners.

"Having been denied access to the stock books of the company I take this method of reaching you; and therefore ask you for your proxies in my name as above described with full power of substitution, and with a revocation of any proxies heretofore given by you; or, I will forward blank proxies to you in proper form on receipt of your addresses. My address for the above purposes will be at the Holland House, New York City, New York."

WESTERN MARYLAND.—The shareholders will vote on October 18 on the formal merging, by the purchase of franchises and properties, of the Western Maryland Tidewater, the Potomac Valley, the Potomac Valley of West Virginia, the Piedmont & Cumberland, the Piedmont & Cumberland of West Virginia, the West Virginia Central & Pittsburg, the West Virginia Central & Pittsburg in Maryland, the Belington & Beaver Creek and the Coal & Iron railroads. All these roads are already controlled by the Western Maryland.

WESTERN PACIFIC.—See review of the Denver & Rio Grande annual report on the Editorial page.

